

**UTAH DEPARTMENT OF TRANSPORTATION  
CONSTRUCTION SAFETY AND HEALTH MANUAL**

**May 6, 2002**

## **ABBREVIATIONS and ACRONYMS**

CM	- Construction Manager
RE	- Resident Engineer
PPE	- Personal Protective Equipment
JSA	- Job Safety Analysis
CSE	- Confined Space Entry
CSC	- Confined Space Check list
LOTO	- Lock-out/Tag-out
CFR	- Code of Federal Regulations
PEL	- Permissible Exposure Limits
PPM	- Parts per Million
U.G.	- Underground
UDOT	- Utah Department of Transportation
OSHA	- Occupational Safety & Health Administration
MSHA	- Mine Safety & Health Administration
UFC	- Uniform Fire Code

UDOT / ENGINEER - Means the OWNER or Owners Representative as it pertains to such construction job site. This will include UDOT (Utah Department of Transportation).

UDOT Safety Risk Management Team – Means the Owner (UDOT / ENGINEER), and all applicable insurance carriers working together to implement the insurance program.

## PREFACE

Contractors may utilize all or portions of this manual as the basis for their own safety and health plans. UDOT bears no responsibility for either the quality of such plans or their enforcement. In short, as required by law, each Contractor is responsible for protecting the health and safety of its employees while ensuring they have a safe and healthful place to work. The UDOT Safety Plan will be the minimum acceptable level of safety allowed on UDOT projects and applies to UDOT rights-of-way and contractor facilities supporting UDOT projects.

The UDOT / ENGINEER and UDOT Safety Risk Manager will monitor Contractors and/or Subcontractor's implementation and application of their respective safety programs at the work site. The UDOT / ENGINEER and UDOT Safety Risk Manager have the authority to stop work when either site conditions and/or work practices present an imminent danger (i.e. may result in serious injury, death or extensive property damage) until those conditions and/or practices are corrected. A "Safety Notice of Non-Compliance" (See Appendix A) will be issued to the Contractor. If corrective measures are not taken immediately no part of the time lost due to any such stop work order shall be made the subject of a claim for extension of time or increased costs by the Contractor or responsible Subcontractor. The UDOT / ENGINEER and UDOT Safety Risk Manager shall not be liable for any damages experienced by the Contractor or responsible Subcontractor due to the work stoppage. Progress payments may also cease until the Owner is satisfied that the Contractor and/or its responsible Subcontractor is in full compliance with all applicable safety and health rules, standards and regulations.

Contractor's are required to discipline and/or dismiss employees who violate established rules and regulations. This includes immediate termination for serious violations, repeated violations, or the refusal to follow safety and health rules.

The UDOT / ENGINEER and UDOT Safety Risk Manager shall have the authority to effectively remove from the site any person who is regarded as a frequent violator of safe work practices, or who fails to ensure persons working under their supervision or in a work place they control are not exposed to serious work hazards. Any "Responsible Person" assigned to identify existing and predictable hazards and authorized to eliminate them, that fails to perform this duty for any reason shall be replaced by the employer on recommendation by the UDOT / ENGINEER and/or UDOT Safety Risk Manager.

When confronted with non-serious hazards, The UDOT / ENGINEER or UDOT Safety Risk Manager will advise the responsible contractor of the condition, and obtain a date from that Contractor by which the non-serious condition will be abated (to be no more than 48 hours). The responsible Contractor will adopt means to prevent the exposure of its employees and others to the non-serious condition. If the responsible Contractor fails to take corrective action by the agreed upon abatement date, The UDOT /

ENGINEER has authority to retain the necessary craftsmen to perform the work with the costs for all such labor and material being back charged against the responsible Contractor. In exercising this authority, the Contractor shall have no recourse against either the UDOT / ENGINEER or the UDOT Safety Risk Manager for any damages that may arise as a result of such stoppage. Established work schedules will not be automatically extended to accommodate the period of any stoppage occasioned by such corrective work.

The Contractor shall not receive additional payment or reimbursement for safety items and procedures, which have been identified as required by the Safety Program.

Failure to comply with the contract safety requirements will be considered as non-compliance with the contract and may result in remedial action including withholding of progress payments due the Contractor and/or termination of the Contractor from the site.

In the event the work or any portion thereof is shut down by either an outside agency or because of an unsafe condition as determined by the Project Management Team, the responsible Contractor shall bear the total cost to the Owner caused by that shut down.

## **PROJECT SAFETY AND LOSS PREVENTION POLICY**

The goal of the UDOT is to achieve zero accidents and injuries through rigorous training, regular monitoring of work practices and enforcement of safety requirements. UDOT will partner with the Contractor to provide our workers the safest work place possible.

### **SAFETY RESPONSIBILITY**

The General Contractor is responsible for surrounding himself with trained and experienced associates. The knowledge, skill and ability of both Contractor and Subcontractor employees are a direct reflection on the General Contractor. The General Contractor is responsible for the safe work practices of all workers on the project, including Subcontractors of any tier, including but not limited to truck haulers, suppliers, service providers, consultants and visitors. All individuals, including the UDOT personnel, on the project at any time will be required to adhere to full project safety standards.

UDOT construction projects with a minimum bid value of \$1 million, but less than \$3 million, will require that the General Contractor designate a qualified Safety Manager with a verifiable broad-based safety background including completion of the OSHA 500 Train the Trainer course with a current certificate or equivalent capability. The Contractor Safety Manager on a project of this size will monitor safety a minimum of 20 hours per week as long as the UDOT Work Zone Safety Inspection scores remain at or above 90/100. If UDOT Work Zone Safety Inspection scores fall below 90/100, the Contractor Safety Manager may be requested by the UDOT Engineer and the General Contractor to provide safety training or to spend more than 20 hours per week on the project monitoring project safety. All Contractor Safety Managers will be required to demonstrate safety proficiency to the UDOT Region/District Safety Manager. The Contractor Safety Manager will not have production-related responsibilities while on the project.

UDOT construction projects with an initial bid value in excess of \$3 million, will require that the General Contractor designate a qualified Safety Manager who has completed the OSHA 500/501 Train the Trainer course, with a current certificate, and verifiable success managing OSHA safety in a similar construction environment. The Contractor Safety Manager will be available to the project a minimum of 40 hours per week. The Contractor Safety Manager will not have production-related responsibility and must be able to demonstrate proficiency to the UDOT Region/District Safety Manager and the UDOT Safety Director.

## **ANNUAL OSHA SAFETY TRAINING**

All persons expecting to work on a UDOT construction project must be able to demonstrate completion of a minimum of 10 hours of OSHA safety training during the current calendar year.

Once work starts on any UDOT construction project, it is understood that all preconstruction safety training has been conducted and furnished to all construction workers. Even as the General Contractor is responsible for verifying professional skills and ability, he or she is also responsible for verifying that annual required OSHA training has been received. Since Contractor OSHA safety training is required and verified prior to the start of work, any safety violations reported thereafter may be considered to be a willful disregard of safe work practice and not resulting from any lack of training.

## **PROJECT SAFETY INSPECTIONS / COURTESY INSPECTIONS**

During the first week of work, the UDOT Region/District Safety Manager or the UDOT Safety Director will conduct one courtesy non-scored Work Zone Safety Inspection to help interested first time General Contractor's understand what the UDOT Work Zone Safety Inspections consist of. The UDOT Project Engineer will order such a courtesy Work Zone Safety Inspection, generally by scheduling with the Safety Manager at or immediately after the preconstruction meeting.

## **SAFETY INSPECTIONS**

It is the intent of the UDOT Region/District Safety Managers to consistently call safety violations as they are seen. If all major safety concerns are addressed, the Contractor will be graded as close to 100/100 as deserved. If 10 different workers are not in full project required PPE, then each violation will earn deductions.

The UDOT philosophy toward safety is that each worker's individual life and safety is much too important for the UDOT to be willing to overlook any violation of safe work practice. The effort to thoroughly and fairly report the overall work environment as near to snapshot quality at that point in time involves experience, good notes, and photographs of representative events.

## **SAFETY WALK THROUGH**

The safety walk through will involve the UDOT Region/District Safety Manager and/or Safety Director, UDOT Construction crew member, and the Contractor Safety Manager. Prior to an official inspection, it is hoped that the UDOT Construction team together with the Contractor team will be constantly vigilant to point out and correct safety violations. If the arrival of the UDOT Safety Manager triggers a sense of project personnel feeling they must warn colleagues to suddenly act differently, you may not be invited to the next walk through.

## **GENERAL CONTRACTOR RESPONSIBILITIES**

The General Contractor selected his Subcontractors and is responsible for their safety performance as much as for his/her own employees. If a General Contractor's crews are in full safety compliance, but one Subcontractor scores three safety deduct points and another Subcontractor records eight deduct points, the UDOT will grade each Subcontractor for their actual performance, but the General Contractor assumes the eleven deducts of all the aggregate scores of the Subcontractor's. It is necessary for the General Contractor Safety Managers and Supervision to pay constant attention to their Subcontractors.

## **UDOT RESPONSIBILITIES**

The UDOT Region/District Safety Managers are required to perform Work Zone Safety Inspections at least once every month. In addition, the UDOT Safety Director may on occasion accompany the Region/District Safety Managers or visit projects in place of the Region/District Safety Manager. In the event a Work Zone Safety Inspection score falls under 90/100, a follow-up Work Zone Safety Inspection will be done within seven working days.

When a General Contractor's aggregate safety score falls below 80/100, the UDOT Project Engineer will immediately schedule a meeting involving project staff and the following: the UDOT Region Engineer for Construction, the UDOT Engineer for Construction, the UDOT Region/District Safety Manager, the UDOT Safety Director, the UDOT Risk Manager and such project Subcontractors as may have contributed to the problem.

All Work Zone Safety Inspections will be immediately provided to the UDOT Project Engineer who will forward the results of the report to the General Contractor. If safety violations were identified, the Contractor will be required to correct the problems in the shortest possible amount of time and report back to the UDOT Project Engineer of the actions taken, including possible discipline for the individuals responsible for the safety violations. Copies of all safety related correspondence to and from the Contractor will be promptly sent to the Region/District Safety Risk Manager and UDOT Risk Management.

The UDOT Risk Management will maintain a database, by contract number, of all Work Zone Safety Inspections. The scores of all Work Zone Safety Inspections will factor into the pre-qualification process used by the UDOT when selecting successful proposals for contract services.

## 1.0 INTRODUCTION

### 1.1 General

The Construction Manager, the Prime Contractor, together with its subconsultants will form an integrated Team to manage the construction work assigned by UDOT. Employees from these firms will be assigned to project staff positions on a full time or part time basis as required by the work. Positions in the project organization will be filled by employees of the prime or subconsultants based upon the individual's experience and seniority.

### 1.2 Construction Safety and Health Manual, Purpose and Scope

The purpose of this plan is to outline a program for the prevention of job-related accidents and health problems during the construction of **The Projects**. This manual sets forth the many elements which all Contractors and Subcontractors of every tier must include in their safety program. This manual is not all-inclusive. Other elements may be added, or conveyed individually to Contractors to whom they expressly apply. There are other essentials which some Contractors, by nature of the specific type of work being performed, must integrate within their own safety program.

The UDOT / Engineer and UDOT Safety Risk Manager's role in achieving Safe Production includes overall management responsibility for site safety and health. This responsibility does not supersede, override, or take precedence over that of Contractors who are ultimately responsible for the safety and health of their employees and visitors and the protection of property. The primary function of the UDOT Engineer and the UDOT Safety Risk Manager, as it relates to construction safety and health, is to monitor and ensure Contractor compliance with the safety and health standards required by law, and to administer and enforce the conditions of the contract pertaining to safety, health, and security.

This plan sets forth basic responsibilities, guidelines, rules, and regulations for all personnel involved in the construction of **The Projects**. The intent of this manual is to enhance and supplement the safety and health standards which are required by law, in contract documents, and are applicable to the Construction projects for which it is applied. This manual does not cover the full spectrum of published safety and health standards mandated by law, and the Contractors shall not assume that they are responsible only for those which are referenced in this manual, nor that they are current and quoted as published. It is the responsibility of the Contractor and its employees to ensure that they are in compliance and their safety program is in compliance with all safety directives required by law.

In the event of a conflict between the provisions of this manual and applicable local, State or Federal safety and health laws, regulations and/or standards, contract documents or the Contractor's Safety Plan the more stringent shall apply.



### 1.3 Safety and Health Program Objectives

The objective of the safety and health program is to assure that both the Engineer and Contractor personnel are treated as the most important assets of the Project.

All Project safety and loss control efforts shall be directed toward **The Project's** Construction Program and UDOT Safety Risk Management's objectives to **ELIMINATE** personal injuries, damage to property, and minimize the effects of accidents on both the individuals and the Project.

Beyond satisfying the key humanitarian and moral obligations, specific objectives of the program are to:

1. Increase efficiency and cost reductions,
2. Comply with all statutory requirements and in some cases exceed minimum standard,
3. Maintain a good working relationship with regulatory agencies,
4. Avoid citations and penalties,
5. Avoid publicity that an unsafe project produces,
6. Improve workers morale.

### 1.4 Safety and Health Program Effectiveness

The effectiveness of the Safety and Health Program will depend upon the active participation and personal cooperation of all. Project participation and coordination of efforts toward carrying out the following responsibilities are needed for an effective program. Project safety elements are to:

1. Ensure proper planning of all work to minimize personal injury, property damages, and loss of productive efforts.
2. Establish and maintain a system for early detection and correction of unsafe practices and conditions.
3. Maintain adequate protection of adjacent public and private properties to provide for the safety of the public.
4. Establish and implement safety education programs designed to stimulate and maintain the interest and active participation of all personnel involved with the Project.

## **1.5 Organization and Implementation**

The safety manual establishes minimum standards of performance regarding safety during the course of the work on **The Project**. The prevention of job- related injuries and illnesses may require additional safety devices and/or procedures beyond these minimum standards. The Engineer will alert Contractors if safety, health or security devices or procedures are deficient. The UDOT / Engineer and UDOT Safety Risk Manager will monitor the Contractor's safety performance for full compliance with all applicable Federal, State, and local safety and environmental requirements.

## **2.0 RESPONSIBILITY**

### **2.1 General**

Each participant involved in the construction of **The Project** is individually responsible for conducting their activities to ensure compliance with all applicable safety and health requirements. The Construction Manager with help from the UDOT Safety Risk Manager is responsible to monitor the construction activities of the Contractors / subcontractors on these construction projects to monitor compliance with OSHA, Federal, State, Local rules and regulations, the Contract and the Project Safety & Health Plan.

### **2.2 The UTAH DEPARTMENT OF TRANSPORTATION**

The UTAH DEPARTMENT OF TRANSPORTATION requires that all participants in the construction of **The Project** observe and be responsible to meet or exceed all applicable Federal, State and/or local safety and health requirements. This mandate remains in effect during all Project construction phases. UDOT has responsibility to support the Safety/Loss Prevention Program established for **The Projects** and the UDOT Safety Risk Manager.

### **2.3 The Engineer – Project Safety**

Has overall responsibility for management of construction of **The Project**. This responsibility includes oversight of the Safety and Health of all personnel on the job sites, and monitoring that subordinate managers and staff are indoctrinated with the safety philosophy and commitment of **The Project** Safety and Health Program. The Engineer may delegate authority to facilitate any and all aspects of the Safety and Health Program, and to that improvements are made where needed.

The Engineer is responsible for implementing this Safety and Health Program at the project level. The following specific safety and health issues will be followed:

1. Establish and maintain a healthy and safe work environment by adhering to the guidelines and procedures issued in the latest issue of the Safety and Health Program.
2. Monitor compliance of Engineer employees and Contractors with Safety/Health and Security rules and regulation set forth by all regulatory agencies as well as those established by this program.
3. Pre-plan work activities in order to identify and control any safety and health issues which may pose a hazard to employees or others.
4. Hold, at a minimum, bi-monthly meetings with Engineer staff to discuss accident prevention measures, review any accidents which might have

occurred since the last meeting, and institute any additional safety measures necessary to prevent future accidents.

5. Provide Engineer employees with knowledge of all Contractor/ Subcontractor safety and health programs that may be unique. The Engineer will give special attention to those operations that require a coordinated effort by the Contractors and the Engineer.
6. Maintain open communications with the UDOT Safety Risk Manager on safety/health, security, environmental and insurance issues. The Engineer will consult with the UDOT Safety Risk Manager on Safety/Health, Security, Environmental and Insurance issues.
7. Enforce the same general requirements for all visitors entering the project site. Provide safety equipment to visitors/vendors; a visitor's log will be established and maintained at each project.
8. Arrange for specific job safety training which may be needed by Engineer employees using or operating special equipment or entering confined spaces and/or the use of other personal protective equipment or other analysis instruments.
9. Provide project safety oversight audits as scheduled and monitor corrective actions. The Engineer will conduct, at a minimum, a monthly project safety inspection with the UDOT Safety Risk Manager.
10. Regularly brief the UDOT site representative of the potential safety and health issues that may affect the work environment. Briefings will include incidents that may pose a potential third party claim exposure to the STATE.
11. Assist the UDOT Safety Risk Manager in the investigation of accidents and incidents. Assure that Contractors take corrective action to prevent future accidents.

## **2.4 The Engineer – Project Correspondence**

The Engineer or his designee is the source of all official correspondence to and from the Contractors. The Engineer's Safety Responsibilities include:

1. Include Safety topics in every meeting.
2. Reviewing all Safety inspection reports with the Contractors during the weekly progress meetings.

3. Prior to construction activity by any Contractor, the Engineer will review all pre-work safety Submittals and determine they have been accepted by the UDOT Safety Risk Manager.
4. The UDOT Safety Risk Manager will notify the Engineer if a Contractor has outstanding Safety Deficiencies that could result in delay of payment.

## **2.5 The UDOT Safety Team**

The UDOT Safety Team will serve as the focal point for the administration of **The Project** Safety and Health Program. The UDOT Safety Team's responsibilities will include the following duties:

1. Provide interpretation of current safety and health rules and regulations.
2. Assist in the development of a project-wide Safety Training Program to help train Engineer's / Construction Manager's staff and Contractor personnel and to conduct Safety training.
3. Conduct weekly and quarterly safety inspections with the Engineer and the Contractor Safety Representative.
4. Conduct monthly Contractor safety meetings.
5. Conduct monthly Site Safety meetings with Engineer's staff.
6. Review Contractor Safety Plans.
7. Assist in the investigation of accidents and conduct accident review meetings within 48 hours of an accident.
8. Conduct Pre-work Hazard Assessments to identify potential safety concerns and recommend procedures to eliminate or reduce the hazards.
9. Audit all pertinent records.
10. Audit the security systems.
11. Report all safety/health and security issues to the Engineer.
12. Act as a member of the ESAP Committee.
13. Address any safety/health and security issues that result in conflict.

14. Participate as a member of the UDOT Safety Risk Management Team.
15. Make recommendations for administrative action when Contractors fail to correctly identify safety, health, or environmental deficiencies.
16. Monitor all Insurance claims (workers compensation, general liability, builders risk) covered under the UDOT program.
17. Conduct day-to-day safety operations at the project level.
18. Assist UDOT / Engineer's staff and Contractors with safety/health and security issues.
19. Assist the UDOT / Engineer in implementing project Safety and Security controls.
20. Conduct daily inspections to identify hazards and assure that the Contractors take corrective actions, and conduct weekly inspections with Contractor Safety Representative.
21. Give assistance in responding to accidents and incidents on site, evaluate probable causes, help conduct initial accident investigations.
22. Attend Contractor Tool Box safety meetings.
23. Attend various site meetings including:
  - a. Weekly progress meetings, when possible
  - b. Monthly Contractor safety meetings
  - c. Monthly project safety committee meetings
  - d. Pre-construction meetings
24. Update Safety and Health Manual and security procedures.
25. Realize that primary responsibility will be to recognize hazards and to assure that Contractors correct hazards that are identified.
26. Monitor timely correction of imminent hazards.
27. Conduct a pre-work safety orientation for Contractor's project supervision/foreman.
28. Participate in pre-bid and pre-construction meeting.
29. Assist insurance company with the identification of an Occupation

Health clinic to be used for injured employees covered under the UDOT plan.

## **2.6 Resident Engineers / Inspectors**

Field personnel duties encompass a wide range of activities. Engineer's field personnel will plan their activities with the same care and effort as other portions of their work program.

The Engineer will be looked upon by the Contractors and their employees as an example. Setting a good example for the compliance with the Safety Program requirements, proper work attire and use of PPE.

The safety responsibilities of the Engineer's field personnel include:

1. Verifying that work within their vicinity is performed with safe work practices and methods.
2. Correcting any unsafe act that they notice immediately, by talking with the employee(s) involved, contacting the Contractors supervision and the UDOT Safety Risk Manager. If an imminent danger situation exists, stop the activity immediately and contact the UDOT Safety Risk Manager.
3. Monitor personnel in their vicinity for PPE compliance.
4. Document any safety violations noted and copy to the site safety file and UDOT Safety / Risk Management.
5. Maintain current knowledge of all applicable Federal, State, and local safety and health standards and regulations; ascertain that all subordinate personnel are appropriately knowledgeable; and coordinate application and administration of such requirements at the job site.
6. Attending all required safety and health training.
7. Conducting routine surveys of the work area and operations for compliance with Federal and State OSHA safety standards and regulations. Identify safety deficiencies and initiate corrective action.
8. Recommending cessation of work in unsafe/unhealthful areas. In imminent danger situations, stop work on own authority; and stipulate necessary compliance to permit resumption of such work. Contact the UDOT Safety Risk Manager when these conditions are found.

9. Coordinating safety and health work issues with the Engineer and UDOT Safety Risk Manager.

## **2.7 UDOT Safety Risk Manager will**

1. Give assistance to UDOT, Engineer, Construction Manager and Contractors as needed with compliance of the contract.
2. Assist the UDOT Engineer conduct monthly, or more often as determined necessary, random in-depth safety audits of Contractor's work practices. In any instance where such a safety performance audit is found to have a number of safety violations or a score below 90 points, a follow-up safety audit may be conducted within nine working days to verify that safety violations have been adequately corrected.

## **2.8 Injury/ Claims Management**

Medical clinics have been selected to provide needed medical assistance for employees for job related injuries/illnesses. Maps will be provided. The Prime Contractor shall be held responsible for all accident/incident reports regarding industrial injuries of their employees and all Subcontractors under contract to them.

## **2.9 Contractors**

The Contractor is responsible for the safety/health of employees, Subcontractors, visitors, and vendors in accordance with State, Local and Federal regulations, and the Contract Documents. The Contractor will assign a competent and qualified safety person to the project based on the requirements established in the Contract Document.

As a condition of their contract, all Contractors shall:

Submit to the ENGINEER/UDOT Safety Risk Manager:

1. A site-specific safety plan. Pre-work acceptance is required.
2. Name and qualifications of an on-site safety person. Pre-work acceptance is required.
3. Copies of all weekly Tool Box meetings.
4. Job Safety Analysis (JSAs) pre-work and as required.
5. A list of Hazardous Substances you will bring to site.



6. Employee orientation log.
7. Copy of OSHA 200 Log for the project.

Additional submittals may be required; a complete listing of the safety Submittals and their frequency may be obtained from the UDOT Safety Risk Manager.

The Contractor will:

1. Ensure that all employees, Subcontractors and their employees are given a comprehensive Safety/Health and Security orientation. This orientation shall include general Safety/Health and Security procedures and policies as well as the project specific rules, regulation and specific hazard. Employees will be advised that disregard for these rules, or any other applicable Safety and Health regulations shall be subject to company disciplinary action and/or removal from the project. A Competency Test for Safety must be completed by each employee following the orientation. Completed tests must be submitted during quarterly audits. At some site locations, employee access badges may be issued referencing the site's policy. Employee logs will be signed by all employees prior to starting work. Badge numbers will be noted on this log.
2. Investigate accidents and incidents that result in personal injury or illness, or damage to buildings or equipment. Immediately contact the Engineer and/or UDOT Safety Risk Manager. Attend a post accident review with the Engineer and UDOT Safety Risk Manager within 48 hours of the incident. The Contractor will complete all required reports and, if necessary, contact OSHA as required. Maintain all required records.
3. Conduct daily job inspections, identify unsafe conditions or work practices and assure they are corrected, and maintain documentation. At a minimum of once a week conduct a project inspection with the UDOT Safety Risk Manager, once a month with the UDOT Safety Risk Manager, and once a quarter a records and performance audit with project staff.
4. Assure that employees acting in a supervisory capacity understand and enforce all safe work practices. All foreman and above levels will have the required annual safety training. This documentation will be available for review. **Foreman and above are required to attend 10 hours of OSHA hazard recognition training annually. This training will be coordinated by the UDOT Safety Risk Manager and conducted by Certified Instructors.**

5. Assure that a qualified "Competent Person" is provided at work locations where required by OSHA.
6. Assure that all Personal Protective Equipment (PPE) is available and being used as required.
7. Assure all construction equipment and motor vehicles have a daily pre-shift inspection, repair and controls are in compliance with the safety requirements of the project and OSHA. Annual crane certifications must be presented to the UDOT Safety Risk Manager prior to the crane starting work on the project.
8. Prior to making critical crane lifts, detailed plans (JSA) for completing them will be designed and submitted to the UDOT Safety Risk Manager who will review the plan prior to any such lift. (See Appendix C, Critical Lift Checklist)
9. Assure that all hand and power tools are in safe working order.
10. Assure that all work areas are kept clear of debris and trash and adequate trash barrels are placed throughout the work area and emptied frequently.
11. Provide the appropriate number and types of sanitary facilities for employees.
12. Assure that Fall Protection equipment is provided and used. Inspections of this equipment shall be documented and on file for review (See Appendix H). The proper use of safety devices will be strictly enforced.
13. Assure that all perimeter cables, barricades, or any other safety-related items are installed correctly and maintained. If another Contractor must remove a safety item, coordinate this activity with the Contractor who installed the device and other Contractors who may be exposed. Safety devices will be replaced by the Contractor removing them. Warning signs, tags, or barricades will be installed if other safety devices are removed.
14. Assure that employees receive adequate training as required by the project and OSHA. Additional training for foreman and safety representative may be required based on unique hazards involved in a task.
15. Attend monthly Contractor safety meetings held by the UDOT Safety Risk Manager.

## **2.10 Safety Notice of Non-Compliance**

If the Contractor does not cooperate, the UDOT Safety Risk Manager and the Engineer will discuss the situation and determine whether or not a Safety Notice of Non-Compliance shall be issued to the Contractor. If they agree that the Safety Notice of Non-Compliance should be issued, the Safety Notice of Non-Compliance (see Appendix A) is completed and signed by the UDOT Safety Risk Manager, the Engineer, logged and issued by the Engineer (see the Stop Work Order procedure).

## **2.11 Drug-Free Workplace Policy**

The contractor will submit as a part of their overall Safety and Health Plan a copy of their company Drug-Free Workplace policy. This policy shall at minimum comply with Appendix L.

The prime contractor will ensure that all subcontractors and lower tier contractors are in compliance.

### **3.0 INSTRUCTION AND TRAINING**

#### **3.1 Safety Orientation Program**

Newly employed, promoted, and/or transferred personnel will receive a comprehensive orientation regarding the general safety and health rules and regulations as well as the site-specific policies and hazards. The Contractor is responsible for the orientation of his employees, Subcontractors, and visitors. Documentation of this orientation shall be submitted to the Engineer. The Contractor will issue Hard Hat Stickers to each contractor involved in a project. These stickers are to be issued to an employee following his/her orientation, and then documented on a Training Log Sheet. The Engineer's staff will receive a site orientation provided by the UDOT Safety Risk Manager. (See Appendix G Employee and Visitor Logs).

Safety orientation of all personnel will include at a minimum the following topics:

1. Project site-specific orientation
2. Employer/Personnel Responsibilities Under Utah and Federal OSHA Standards
3. Eye Protection
4. Head Protection
5. Confined Space Entry (CSE)
6. Proper Use of Safety Harnesses and Lanyards
7. Perimeter Guarding
8. Housekeeping
9. Fire Protection
10. First-aid Facilities and Emergency Procedures
11. Special Operator Requirements
12. Unique Hazards of the Project
13. Hazardous Communication/ Right to Know, location of MSDS's
14. Drug Free Workplace Policy
15. Accident Reporting Policy

16. Location of Required Posters
17. Job Site Security and Badging (if Applicable)
18. Employee Parking Area (promote car pooling)

The UDOT Safety Risk Manager shall provide additional safety instructions for the performance of hazardous or unfamiliar tasks as required during the performance of the work. This training will be made available to the Contractor, all site personnel, and the Engineer. An OSHA ten-hour training course will be provided. The training will be available to all Engineer staff, Contractors, and Subcontractors at a location and time to be determined by UDOT. This training will meet the requirements for the annual supervisor safety training.

### **3.2 Safety Meetings**

The UDOT Safety Risk Manager will hold safety meetings for the project Engineer staff with invitations to Contractors and UDOT staff to discuss safety topics associated with the work performed. At the discretion of the Engineer or UDOT Safety Risk Manager, additional meetings may be called as conditions change.

At the conclusion of the safety training meetings, meeting minutes will be completed and promptly (within two days) returned to the UDOT Safety Risk Manager for file retention. Specific topics and a full attendance roster will be incorporated in the minutes. The Engineer's field personnel (Inspectors) who are unable to attend these meetings will attend the contractor's tailgate meetings. Copies of the topic and signature form will be given to the UDOT Safety Risk Manager.

### **3.3 Bulletin Board**

To aid in project training, a safety bulletin board will be established at the Engineer's field office. This board will be used to hold the following documents:

1. All project emergency telephone numbers,
2. Any topical Project safety and health posters,
3. Safety and health communications,
4. Hazardous material spill reporting information, and
5. Individual Contractor safety performance.

### **3.4 Safety Committee Board For Large Company Projects**

To be established as determined prudent by Engineer or UDOT Safety Risk Manager.

### **3.5 Group Tours and Site Visitors**

#### **3.5.1 Conduct of Tours**

It is particularly important that a high degree of protection be afforded to all persons on the authorized tours of construction work-sites. The following instructions shall be complied with, as applicable, by the Contractor and those responsible for arranging such tours. The following procedures shall be followed:

1. In all cases, the Engineer and the UDOT Safety Risk Manager be advised of any tour in a timely manner prior to the tour taking place.
2. Group tours must be cleared through the site Engineer's office, allowing maximum advance notice.
3. Parties requesting the tour will coordinate the tour arrangements and ensure notification to the site Engineer.
4. If visitors to the site will be on foot or out of the vehicle/bus the individual or organization requesting the tour will ensure that:
  - a. The number of visitors - Tour groups in non-hazardous areas will be limited to no more than twenty-five persons per tour guide.
  - b. Clothing - Visitors will be required to wear pants or slacks, shirt or blouses, and sturdy leather shoes or boots. Sneakers and high-heeled shoes will be prohibited.
  - c. Minors - Persons under 18 years of age will not be permitted on project tours, unless they have received special considerations from the Engineer.
  - d. Protective Equipment - Hard hats, eye protection, earplugs, and other protective devices will be required as per the UDOT Safety Plan.
  - e. Release and Hold Harmless Agreement - Each visitor shall be required to sign the visitor acknowledgment of **The Project** rules agreement prior to the commencement of the tour. A sample Visitor log is contained in this plan as Appendix G.

- f. All visitors shall comply with Contractor safety requirements.
- g. Tours will be escorted by the Engineer's site personnel.

### **3.6 Security**

Some job sites will be protected with a fenced perimeter. These sites will be controlled with on site security services, vehicle access permits and worker identification badges. These controls do not release the Contractors of their responsibility for the security of their own equipment and materials.

For those sites that are not able to be controlled at a main access point the Contractors are fully responsible for the security of their equipment and materials. The Engineer will inspect the Contractor's project to ensure adequate (as determined by the Engineer) security measures are being taken to protect materials, structures and limit liability exposures. If the Engineer finds security measures to be inadequate the contractor will be notified and additional measures to improve security will be required at no cost to the owner based on contract requirements. This may include storage of materials off site.

All accidents, theft and/or vandalism must be reported to the Engineer immediately and a written report submitted within 24 hours.

## **4.0 REPORTING ACCIDENTS, INCIDENTS, AND OCCUPATIONAL INJURIES AND ILLNESSES**

### **4.1 Investigating and Reporting Accidents/Incidents**

Prompt, thorough investigation and reporting of accidents/incident on any **Project** is imperative. Accidents and Incidents are defined as follows:

**Accidents** are unplanned events not involving vehicles that result in:

1. Personal injury or death.
2. Equipment or property damage, including damage from fire.
3. Near misses that had the potential for serious injury or death.
4. Exposure to potentially hazardous chemicals.

**Incidents** are events that fall under one or both of the following categories:

1. Events involving vehicles:
  - a. Near misses,
  - b. Property damage,
  - c. Personal injury or death.
2. Property theft.

All Engineer employees, Contractors, Contractor employees, and Subcontractors and their employees are required to cooperate fully in the investigation by the Engineer and/or Insurance Carrier of any accident or incident as defined above.

If an accident or incident occurs involving a Contractor, Subcontractor, or visitor, the Engineer and UDOT Safety Risk Manager must be notified **immediately**. If an Engineer staff member is involved the same immediate contacts must be made.

In the event of a serious accident/incident, **NOTHING** may be removed from the scene of the accident/incident until the investigation is completed.

If a serious accident/incident occurs involving personal injury, the site Emergency Services Response Plan will be implemented. The Contractor involved will be responsible for contacting OSHA when required. Written documentation of this contact will be submitted to the Engineer with the accident report within **24 hours**.

If the accident/incident has an environmental impact, the appropriate measures will be taken to control any spills with no employee exposure. Refer to hazardous



materials spills and controls (See Appendix B of this plan).

A Post-accident review meeting will be held within 48 hours of any accident/incident or near miss that results in a Lost Time Injury, if an employee is transported from the site by Emergency Medical Services (EMS), if property damage occurs over \$500.00, or as deemed necessary by the Engineer or UDOT Safety Risk Manager. Attendance at these meetings by the Contractors Project Manager and Safety Representative is mandatory.

After an investigation has been completed, the Contractor shall submit to the Engineer and assigned Insurance Company, the required reports of all accidents or incidents as defined above. The written reports shall be submitted within 24 hours of the occurrence. (If the investigation is not complete, an initial report must be submitted). Additionally, the Engineer will verbally advise the UDOT on-site representative as soon as the basic facts are known. A written accident review will be prepared by the UDOT Safety Risk Manager and presented to the Engineer, who will review the report and forward it on to the UDOT Site Representative within 72 hours. If an Engineer staff member is involved, the accident reports will be prepared by the injured employee or the employees supervisor and will follow the same procedures as described above.

To ensure consistency in reports and investigations, the accident investigation forms in Appendix E will be used by all of the Engineer's staff, Subconsultants and Contractors. Preparation of the state and OSHA accident reporting forms are the responsibility of the individual parties. Copies of these reports shall accompany the Program reports. OSHA 200 logs will be maintained by the individual employer. A copy of this log will be maintained at the site and reviewed by the UDOT Safety Risk Manager in quarterly audits. Engineer Subconsultant staff members are required to maintain their own OSHA 200 Injury Log. The UDOT Safety Risk Manager will coordinate all investigative actions and determine if the investigative action taken is adequate for the occurrence.

#### **4.2 Contractors Rights of Claims Management**

The Contractor has the right and is encouraged to escort an injured or ill employee to the designated medical facility. **Injured employees must only be taken to the medical facility designated by the UDOT Safety Risk Manager for treatment.** (It is not recommended that the injured individual transport them self to the medical facility on the initial visit).

On all claims, the Contractor may arrange meetings with the insurance company to discuss any claim or claims history. If the Contractor wishes a conference with the treating physician, arrangements may be made for such a meeting by contacting the UDOT Safety Risk Manager, who will coordinate this meeting. We encourage Contractor involvement in the management of employee injury claims.

### 4.3 Reporting Occupational Injuries and Illnesses

Upon becoming aware of an occupational injury or illness requiring treatment beyond first aid, the UDOT Safety Risk Manager will assist the Engineer's staff member and/or Contractor(s) involved to document all facts surrounding the accident. The investigation report will be reviewed for the cause of the accident/incident and the corrective measures taken to prevent re-occurrence. This information will be reviewed with the Engineer.

### 4.4 Site Emergency Services Response Plan

If an accident occurs that requires emergency services response (ambulance, Fire Dept., Police, etc.) to the site, the parties involved will:

1. **Call 911**

- a. Give your name.
- b. Give your location.
- c. Name of project.
- d. Phone number you are calling from.
- e. Nature of injury/accident situation.
- f. Tell them that an escort will meet them at the site entrance gate.

Note: When calling 911, DO NOT HANG UP until the 911 Operator understands all information relayed. Let the 911 Operator hang up first. If at all possible **avoid using a cell phone** to make a 911 call.

2. Send a company supervisor, in a vehicle (if necessary), to the site entrance to wait for the emergency vehicle. (Note: Do not drive at excessive speed or create an additional hazard by driving unsafely)
3. The ENGINEER will be contacted at \_\_\_\_\_. The following information will be given:
  - a. Name of person calling/name of company.
  - b. **Exact** location of the accident.
  - d. Nature of incident/injury.
    - If site evacuation is necessary, the Engineer will implement the site Emergency Action Plan.
  - d. Advise the Engineer if emergency services have been contacted.

The Engineer's site personnel will assist the Contractor by clearing the area as needed. If an Engineer's staff member is injured, the Engineer's Office will contact the appropriate emergency service.

When an emergency situation occurs it is imperative that personnel stay calm and remember:

1. Never move an injured employee unless he/she is exposed to further injury. (Always support the head, neck, and spine).
2. Cranes in the area of an injured employee can be unloaded and ready to help move an injured employee, providing proper equipment (communication, rigging, approved crane, etc.) is available and the involved contractors mutually agree to the use of the procedure. Mutual agreements between contractors should be reached before an emergency occurs.
3. Never enter a confined space or excavation unless required safety measures have been taken.
4. Accident investigation and accident review with the Engineer, UDOT Safety Risk Manager, Contractor Project Manager, and Contractor representatives will be held within 48 hours following the accident.
5. If an accident occurs after hours or on a weekend, please use the emergency phone list to contact the following: site specific contacts and emergency phone numbers will be provided during the pre-construction orientation.

## **4.5 Third Party Injuries and Property Damage**

### **4.5.1 Accident and Incident Reports**

Accident reports involving any outside parties or property will include at a minimum, the items listed in the paragraph below. In the event of a fatality or serious injury, or a major accident involving outside (non-employee) persons, the incident must be reported **IMMEDIATELY** to the Contractor's Safety Representative and the UDOT Safety Risk Manager.

If an accident occurs after hours or on a weekend, please use the emergency phone list to contact the following:(to be provided during orientation)

Engineer	Work: _____
	Home: _____
	Mobile: _____
UDOT Safety Risk Manager	Work: _____
	Home: _____
	Mobile: _____

#### **4.5.2 Investigation Checklist**

Investigation checklist of the minimum information required when accident involves outside persons or property should include the following information:

1. Date and time of incident.
2. Exact location and address of incident.
3. Full names of all parties involved in the accident, including witnesses.
4. Complete addresses and telephone numbers.
5. Injured person's occupation, age, and employer.
6. Description of what injured person was doing when hurt.
7. Nature and extent of the injury.
8. Where injured was taken for treatment and how?
9. Description of property damaged, identification numbers, etc.
10. Owner of property damaged and address of owner.
11. Year, make, model, serial number, license number of vehicle.
12. Names of other party's insurance company(s).
13. Witnesses' statements or accounts of accident.
14. Names, addresses, occupations of company personnel involved in accident and how involved.
15. Fully describe details of incident to answer the basic how, when, why questions.
16. Name and identification of person completing report.
17. Signature of Contractor's safety representative.
18. Any photographs if possible.

### 4.5.3 Injury Report Retention

All reports pertaining to injury or illness of employees shall be preserved and not destroyed without approval from the Contractor's safety representative and the UDOT Safety Risk Manager.

## 4.6 Accident Investigating Guide

These guidelines and the Accident Investigation Report forms (see Appendix E) are provided to assist personnel in conducting effective and complete investigations, determining causes and implementing necessary remedial action. The accident investigation report forms provided in this program are to be used by the Engineer and Contractors for the reporting of an accident/incident involving personal injury or property damage while working on **The Project**. These forms along with copies of the state required forms will be submitted to the Engineer within 24 hours.

### 4.6.1 Implementation

#### 1. Injured Employee(s)

Personal information about the injured employee(s) should include:

- a. Name
- b. Social Security Number
- c. Employer
- d. Age
- e. Occupation
- f. Residence
- g. Home Phone Number

#### 2. Supplemental Information

It is equally important to document peripheral information that may have an effect on the accident. Such information might include:

- a. The injured's direct supervisor.
  - Supervisor's home address
  - Supervisor's home telephone number
  - Supervisor's employer

- b. The names, addresses, telephone number and employers of all witnesses.
- c. The date and time of the accident.
- d. The weather conditions at the time of occurrence; e.g., clear and sunny, cold and windy, etc.

3. Accident Location

Detail the exact location of the accident within the work site and, if necessary, include a plot plan and photographs.

4. Work assignment at the time of the accident

Describe the complete scope of the work being performed by the employee injured, giving the exact job the injured was performing when the accident occurred. Was the injured working at his work assignment at the time of the accident? Include the overall experience (or inexperience) of the injured.

5. Photographs and/or sketches of the Accident Scene

- a. Photographs: As a matter of procedure, two prints each (35 mm photographs) of the accident must be taken as soon after the accident as practicable. One set of prints and the negatives taken by Construction Manager / Contractor staff members will be forwarded to the UDOT Risk Management Office. The other set of prints will be retained at the project site.

Photos must include the equipment involved in the accident.

Note: A photo log must be kept detailing the following:

- Date and time the photo was taken.
- Location of the photographer.
- Time the photo illustrates.
- Name of the photographer.
- Direction (north, south, east, west, top, or bottom).
- Frame number of the photo taken.

Sign and date the set of prints sent to UDOT's Risk Management office.

**DO NOT WRITE DIRECTLY ON THE PHOTOGRAPH, WHAT THE PHOTO DEPICTS**

- b. Pictures can be extremely useful for illustrating the accident scene and its relationship to other locations at the construction site.

Remember: Distances indicated on a picture must be pre-measured and indicated for each picture.

- 6. Video coverage will be used at the discretion of the Contractor of the UDOT Safety Risk Manager.

**4.6.2 Witness Statements**

In addition to accident photos, witness statements are crucial pieces of evidence that must be accurately gathered to present a clear picture of how the accident occurred. Witness statements will be taken and submitted to the Engineer as part of the accident investigation report.

- 1. When taking statements, if possible questions should be prepared before taking the statement. When asking questions, interjection of personal thoughts must be avoided.
- 2. To be of the most use, witness statements should be taken as soon after the accident as possible. Every effort should be made to retain witnesses at the job site until their statements have either been tape recorded or taken down in writing.
- 3. Witnesses should be interviewed separately.
- 4. A tape recorder should be used in order to maintain accuracy (advise the witness of the reason for its use). If a tape recorder is not available, take the statement down in long hand. If possible have the witness write the statement himself. Also, have them sign and date the statement.
- 5. When preparing statements, indicate the witness's name, his employer, his occupation, address and telephone number, the date and time of the interview, and the person conducting the interview.
- 6. Request that the witness read the statement and make corrections where appropriate. If the witness is satisfied that the statement is accurate, request that he sign the statement.

#### **4.6.3 How the Accident Occurred**

The key element to an accident investigation is to determine how it occurred. Since years may sometimes pass before the accident facts are reviewed by an outside agency, accident reports and statements should incorporate all the accident facts, to present a clear, concise word picture of the chain of events that preceded the accident.

Both the primary and secondary causes of the accident must be detailed.

1. Primary causes of accidents are those elements that directly caused the injury to occur; i.e., a employee falling from an improperly tied-off ladder.
2. Secondary causes of accidents are those elements that indirectly cause an injury to occur; i.e., a ladder is too short or, possibly, another method might be used.

#### **Accident Analysis**

1. Nature of the Injury: what is the injury? If there were multiple injuries, these must be specified.
2. Part of the Body Affected: the specific part(s) of the body injured must be specified.
3. The Source of Injury: That piece of equipment, substance, or exposure most related to the injury.
4. Accident Type: How did the injured person come in contact with object, substance, or exposure?
5. Physical/Mental Condition: The physical/mental condition of the employee, as gained from witness statements, should be recorded.
6. Hazardous Conditions: Were there any hazardous physical or environmental conditions or circumstances that caused or impacted on the accident?
7. Unsafe Act: Were there any unsafe acts that caused the injury? If other contributing factors are relevant (experience, time, on-job, etc.), these facts should also be highlighted.



## **5.0 OFFICE SAFETY**

### **5.1 Overview**

Office environments are normally safe places to work. However, if housekeeping and maintenance are substandard and safety precautions are not considered the probability of accidents and injuries increase dramatically.

Many of the injuries in offices are associated with slips, trips, falls, and lifting. Additional sources of injury are improper location of equipment, electrical cords and furniture. Some precautions for office safety include:

1. Be careful in swivel chairs. Do not slump back in them without first testing your weight gradually.
2. Have a firm footing when climbing. Use a safe stepladder.
3. Walk, do not run, in corridors or on stairs. Use handrails.
4. Do not stand in front of closed doors; they may open suddenly.
5. Do not push or crowd at elevators, entrances or on stairways.
6. Read mail and other materials at your desk - not while walking.
7. Watch for telephone cords, office machine electrical cords, wastebaskets, and other hazards underfoot which may cause tripping.
8. Use handles when closing files, desk drawers, safe and doors.
9. Keep file and desk drawers closed when not in use. Open only one file or desk drawer at a time.
10. Check office furniture regularly for sharp edges or splinters and loose casters or bolts.
11. Keep sharp objects in a safe place. Handle them carefully.
12. Be sure typewriters, personal computers, phones and printers are solidly placed.
13. Do not adjust or clean power-driven office machines while energized.
14. Do not attempt to make repairs on equipment. Call a qualified technician.

15. Obey “No Smoking” signs. Utah Clean Air Act prohibits smoking in any public building.
16. Use properly grounded circuits for all electrical equipment.
17. Get help when lifting heavy objects. Always use proper lifting techniques.
18. Never use office furniture as steps to reach high objects.
19. Store flammables in proper storage cabinets, not in the office.
20. Inspect fire extinguishers and assure employees are trained in their use.
21. Have emergency phone numbers posted by each phone.
22. Conduct fire drills annually.
23. Post evacuation and meeting locations in large buildings.
24. Never overload electrical outlets or run cords in walkways.
25. Avoid placing cabinets or bookshelves where they can be easily toppled or cause injury.
26. Mobile job-site office trailers shall have sturdy access platforms with handrails on all exposed sides: on both steps and platforms.

## **6.0 HAZARD COMMUNICATION (HCS)**

### **6.1 Overview**

The Hazard Communications Standard (HCS), as mandated by OSHA, charges that Contractors are responsible for evaluating hazards of all chemicals, and transmitting information concerning the hazards to affected employees. Information is transmitted by means of a Hazard Communication Program. The Hazard Communication Program shall contain the following elements.

### **6.2 Hazard Communication Program Guidelines**

1. The Contractors must develop, implement and maintain at the work place a written Hazard Communication Program describing how each of the elements will be met. The following must be included.
  - a. An inventory list of the hazardous chemicals known (or suspected) to be present at the site, and a copy to the Engineer along with MSDS.
2. Methods to be used to inform employees of the hazards of non-routine tasks.

Note: Contractors who produce, use, or store hazardous chemicals in such a way that the employees of other Contractors may be exposed shall additionally ensure that the Hazard Communication Program developed includes the following:

- a. Methods to be used to provide the other employees with a copy of the MSDS, or should be made available in a central location in the work place, for each hazardous chemical that the other employees may be exposed to while working.
- b. Methods to be used to inform employees of steps to be taken to protect employees during normal operations and in foreseeable emergencies; and,
- c. Methods to be used to inform the other employees of the labeling system used in the work place.

### **6.3 Labels and Other Forms of Warning**

All hazardous chemicals must display original labeling.

### **6.4 Material Safety Data Sheets (MSDS)**

Contractors must maintain MSDS for each hazardous chemical used. Additional Contractor responsibilities for MSDS's include:

1. Maintain copies at the project site of the MSDS's for each hazardous chemical in the work place, and ensure that they are readily accessible to employees.
2. The MSDS's will be kept at each Contractor location so any employee can immediately obtain the required information.
3. Copy all MSDS information to the Engineer and note where material will be stored and used on Project site.

### **6.5 Employee Information and Training**

Contractors must provide employees with information and training on hazardous chemicals in their work area at the time of initial assignment and whenever a new hazard is introduced.

1. Information must include:
  - a. Requirements of the Hazard Communications Standard,
  - b. Any operation in their work area where hazardous chemicals are present,
  - c. Location and availability of the written program, including the list(s) of hazardous chemicals and MSDS's.
2. Training must include:
  - a. Methods that can be used to detect the presence or release of hazardous chemical in the work area,
  - b. Physical and health hazards of the chemicals in the work area,
  - c. Personal protective measures and equipment,
  - d. Specific details of the employers Hazard Communication Program.

Employee training for this requirement shall be documented and acknowledged by employee signatures following each session. This documentation will be maintained at the job site for review.

## **6.6 Specifications for Hazardous Communications Program Submittals**

The Contractor shall submit to the Engineer a copy of the site Hazard Communication Program (including MSDS's) prior to beginning on-site construction activities. Following review and acceptance, the Hazard Communication Program will be incorporated into a central registry.

### **1. Material Safety Data Sheet (MSDS) Master File**

The master file shall be set up by the Engineer to maintain material safety data sheets that have been submitted by the Contractors. This master file does not release the Contractor of his responsibilities to advise other Contractors of hazardous substances they may be exposed to. This information will be available for use in emergency situations (i.e., spill, fire, employee exposure).

### **2. Audit and Review**

It is the responsibility of the Contractor Safety Representative to review the employer's Hazard Communication Program on at least an annual basis. All revisions and updates shall be incorporated to reflect changes in the purchase, use, storage and handling of hazardous chemicals at **Project** work sites.

It is also the responsibility of the Contractor Safety Representative and the UDOT Safety Risk Manager to periodically audit procedures in the use of hazardous materials and to institute corrective action where required to meet the requirements of the HCS.

## **7.0 WORK PRACTICE CONTROL**

### **7.1 Overview**

The primary focus of this Safety and Health Plan is to provide guidance for the Engineer and Contractors. Each Contractor will have submitted a safety and health plan. The focus of the Contractor safety and health plans are to advise employees of safe construction and support operations, unique to their segment of Project completion. Depending on operations, the Engineer's staff may need to review both this Plan and the Contractor's Safety and Health Plan before continuing operations. This added review by the Engineer is required because of the highly specialized nature of the Contractor(s) operational requirements.

### **7.2 Purpose and Scope**

It is a **Project** requirement that each and every employee conduct their individual operations in accordance with OSHA for all project operations. Each Contractor has a safety and health plan which is unique to its operation. During the period of time that the Engineer's Staff Member interact with Contractor operations, the specific requirements of the individual Contractor's safety and health plans may be followed as a more stringent requirement.

### **7.3 Specific Work Practice Control Procedures**

For operations wherein the specific Contractor does not have set procedures, the UDOT Safety and Health Manual shall be used as the basic guide to conduct specific operations. However, because all procedures used to provide a safe and healthful work environment must be tailored to meet various state, federal, and operational requirements, modification to the procedures contained in this plan may be required. A JSA must be reviewed and accepted by the UDOT Safety Risk Manager prior to the start of work. Where questions or other concerns exist, the UDOT Safety Risk Manager shall be contacted for further assistance. The "Preface" section of this plan should be reviewed prior to any and all Contractors use of specific plan operating procedures.

### **7.4 Personal Protective Equipment Details**

1. Hard hats
  - a. Hard hats (ANSI Class B Approved) are to be worn, as designed, while within the construction area. Hard hats are not required within office areas. Metal hard hats and cowboy hard hats are not permitted.
  - b. Any alteration of hard hats (such as painting, punching in holes, or cutting off brim) is not allowed. Company logos are permitted.

- c. Cowboy hard hats are not acceptable by anyone on UDOT projects at any time.
2. Eye and Face Protection
- a. 100% eye protection shall be worn at all times while on the project site. Face shields shall be worn in addition to safety glasses when the face is exposed to flying debris, i.e. using a disk grinder and chipping hammers, hand-held gasoline powered cut off saws and chain saws.
  - b. Safety glasses shall be worn at all times and shall be free of defects and provided with side shields.
  - c. Regular sunglasses are not acceptable for eye protection.
3. Safety Harnesses and Lanyards
- a. Safety Harness and anchored lanyard (Fall Arrest System) must be used by anyone working on elevated surfaces without standard Fall Protection. A full body harness is **REQUIRED** (see Fall Protection Section 7.8) when employees are exposed to unprotected falls.
  - b. Lanyards must be tied off to a member of substantial structure (5000 lbs) at a point above the worker. Lanyards must contain a shock absorber to reduce the force generated during a fall. **(See Section 7.8.4(f)) Only hooks with locking snap hooks that operate in "as new" condition will be used.**
  - c. Where other positive means of fall protection are not available, individuals must tie-off when working six feet or more above ground and lower levels, if an impalement hazard exists, tie-off is also required when less than six feet above ground and 100% tie-off is required if impalement hazards cannot be protected in accordance with OSHA regulations.
  - d. Daily routine inspections of belt/harness and lanyard by workers must be conducted prior to each use. The Contractor will conduct and document regular inspection (every three months) of all fall protection equipment. (Refer to Appendix H, Inspection Records)
  - e. Lanyards are to be used for their intended use only.
  - f. Damaged belts/harnesses and lanyards must be discarded.

#### 4. Respiratory Protection

- a. When respirators are required, OSHA requires a medical evaluation and respiratory training, including training in disposable fume/dust/mist mask use. Each Contractor will provide the required training and have a written respirator program, which will include fit testing, equipment selection, and physical examination, if required.
- b. Care must be taken to ensure correct selection of respirator for the chemical/gas exposure. Monitoring of the exposure may be necessary to determine proper respirator requirements. Documentation of air monitoring test results will be maintained.
- c. Reusable respirators must be sanitized on a daily basis. A Respirator Program must be established to ensure compliance. Proper storage is required.
- d. Fresh airline hoods may be required for some operations, including but not limited to sandblasting operations. (Refer to Section 9.10).

#### 5. Hearing Conservation

- a. Suspected high noise areas (85 dba or higher) will be monitored by the Contractor with a sound level meter. The results of the test will be documented.
- b. The Contractor is required to determine the noise levels in their work area. If these levels are found to exceed the Permissible Exposure Limits, a Noise Conservation Program must be implemented and warning signs must be posted. The Contractor will inform the Engineer of all audiometric test results and specific areas or equipment to be tested.
- c. Hearing conservation protection will meet the exposure requirements; generally, a disposable insert is permissible for protective equipment. In extreme high noise areas, earmuff devices may be needed in addition to the disposable plugs.
- d. Noise levels may be monitored in work areas on an as-needed basis by the appropriate Engineer's Staff Member to verify Contractor tests and determine noise level exposure for personnel in the area.



6. Lifelines

- a. Independently secured lifelines or other ANSI approved methods will be used by all personnel working on two-point suspended scaffolds or float scaffolds.
- b. Lifelines must be secured to a permanent part of the structure. Lifelines may not be attached to scaffold support members, unless secondary safety cables are used, per OSHA regulations.
- c. All affected workers must have separate lifelines.

7. Minimum Clothing Requirements

- a. Hard-sole leather work boots must be worn. Safety toed leather boots are recommended but required by UDOT personnel.
- b. Hard hats are required on all UDOT construction projects by all contractor and owner personnel. Cowboy hard hats are not allowed on UDOT projects.
- c. Shirts must at a minimum cover the stomach and shoulders. Tank tops are prohibited.
- d. Pants must be full length.
- e. Personnel should avoid wearing polyester in confined areas.
- f. Excessively loose clothing should not be worn, this includes sweat pants.
- g. Protective steel-toe shoes or boots must be worn when an operation poses a potential hazard to feet and are recommended at all times for all construction employees.
- h. Tennis shoes and non-leather boots (including ANSI approved) are strictly prohibited.
- i. Safety glasses with side shields shall be required on UDOT projects at all times.
- j. Orange or other approved safety vests are required (reflective for night). Only orange is approved for UDOT personnel. Welding or drilling operations may necessitate excluding loose fitting or flammable vests.

#### 7.4.1 Hand and Power Operated Tools

1. Portable tools having mushroomed heads, split or defective handles, worn parts, or other defects that impair strength or render them unsafe shall be removed from service **immediately**.
2. All filed power must pass through GFCI outlets.
3. Electric power portable tools shall not be hoisted or lowered by their cords.
  - a. Blade guards on portable circular saws shall **NOT** be wedged or tied back in an open position.
  - b. All portable power tools will be equipped with operable guards in accordance with the manufacturers recommendations. Removing a guard will result in the tools removal from site.
  - c. Advisory comment on constant power control switches on power tools.
4. Pneumatic Power Tools.
  - a. All hose connections, including those on the tools, shall be secured by wire or other approved methods, to prevent accidental disconnection. In addition, a whipcheck will be installed at each hose connection to prevent injuries from the whipping of a disconnected or broken hose.
  - b. Manufacturers safe operating pressure for hoses, valves and fittings shall not be exceeded.
  - c. Using a hose to hoist or lower the tools shall not be permitted. Hoses used on elevated platforms will be secured every 15 feet.
5. Hydraulic Power Tools
  - a. The manufacturer's safe operation pressures shall not be exceeded. Tools not needed for the work shall not be left on scaffolds, ladders, or overhead levels. Positive means shall be used to prevent tools from falling.

## **7.5 Job Safety Analysis (JSA)**

### **7.5.1 Policy**

In order to provide all Engineer Staff Members and Contractor employees with a safe workplace through preplanning hazardous work, a Job Safety Analysis (JSA) will be prepared. The written JSA will be completed by the Contractor Superintendent and/or the Contractor Safety Representative in charge of the operation. Review and acceptance by the UDOT Safety Risk Manager prior to the start of work is required. (See Appendix F, JSA forms)

### **7.5.2 Purpose**

To develop a method by which Engineer's Team Members and Contractors can analyze the jobs they perform, and to identify the existing and potential hazards associated with each job step and establish controls for them. These JSA's should be used as a task specific training tool to instruct employees, inspectors, and visitors of potential hazards and required safety precautions.

### **7.5.3 Responsibility**

1. The supervisor (with assistance from safety personnel) shall be directly responsible for the work element is responsible for developing and implementing the JSA. A pre-work review and acceptance by the UDOT Safety Risk Manager is required.
2. The supervisor is responsible for reviewing the JSA with his/her crew and any other persons who may be exposed to the work and/or the hazards related to this work. All employees and other persons involved in the operation are responsible for signing a training log indicating that they understand and will comply with the provisions of the work task. (See Appendix F.)

### **7.5.4 General Requirements**

1. All JSA's shall be reviewed and accepted by the UDOT Safety Risk Manager prior to commencing work activity and before any changes in the work cycle are made. The UDOT Safety Risk Manager will maintain a master file of previously developed JSA's for all Contractors' to assist in the preparation of their JSA.
2. Log sheets and JSA's shall be placed in a conspicuous location at the workplace by supervision.

### 7.5.5 Implementation

1. Job Safety Analysis is required when through pre-job planning, determines that the process, equipment or procedure indicates potential for serious injury and/or property damage. The following hazardous events are examples of when a JSA is required:
  - a. Potential for collapse, (work-in trenching, tunneling. This may include demolition, etc).
  - b. Potential release of stored energy, (electrical, pressure, explosive, etc).
  - c. Crane supported work plate form use.
  - d. Critical crane lifts (two cranes used to lift one load).
  - e. Unusual crane operation as defined by the Engineer.
  - f. Potential exposure to uncontrolled hazardous materials or wastes.
  - g. Blasting operations.
  - h. Abrasive /sandblasting, hydro blasting, etc.
  - i. Potential injury from burns, both chemical and thermal.
  - j. Respirator use.
  - k. Potential oxygen-deficient environments.
  - l. Entry into confined space.
  - m. Potential of entanglement in, on, or between objects.
  - n. Work in public streets and highways.
  - o. Lockout/Tagout.
  - p. Roofing operations.
  - q. Operations involving fall exposure.
  - r. Structural steel erection.

- s. Use of new or hazardous materials, procedures, and/or equipment.
  - t. Powder actuated tool use.
  - u. Suspended scaffolds.
  - v. Scaffold erection.
  - w. Scaffold construction or dismantlement
  - x. Helicopter operations.
  - y. Asbestos related work or any other identified carcinogen exposure.
  - z. Rock drilling.
  - aa. Work on live electrical systems.
2. Upon completion of JSA's, and prior to the start of work, the UDOT Safety Risk Manager will review the JSA for content, the Contractor will conduct training for all personnel involved in the operation, and the UDOT Safety Risk Manager will assist Contractors as needed.
- The forms to be used for JSA'S are shown in Appendix F and include:
- a. Key activities in the sequence in which they occur.
  - b. The potential hazard(s) for each step.
  - c. Specific effective safety measures to eliminate or control the hazard(s).
3. All JSA's shall be developed in sufficient detail to preclude confusion and misunderstanding.
4. Consideration shall be given to movement, work area, specific hazards, safety rules, and recognition of abnormal or unexpected problems.
5. Each JSA shall be completed by the supervisor responsible for the employees conducting the work. The JSA will be jointly reviewed by the Contractor and the individual supervisor prior to starting the work.

### **7.5.6 JSA Documentation and Retention**

1. A completed copy of the JSA must be available for review by the Engineer and the Contractor at the work location or the Project Office.
2. Each employee working on the project must sign a training log indicating that they understand the hazards of the project as indicated on the JSA.
3. At the pre-job conference the Contractor/Subcontractor may be expected to have completed a JSA for review by the UDOT Safety Risk Manager.
4. A copy of the JSA will be retained in the project files. A copy will be maintained in the program central operations file. This file will serve as a master file for use by all Contractors for similar type of activities.

## **7.6 Scaffolds and Work Platforms**

### **7.6.1 Policy**

All work platforms, either temporary or permanent, and scaffolds shall provide all employees a safe surface upon which to complete their work tasks. The Contractor/Subcontractor is responsible for placing all work platforms and scaffolds used on the site and are responsible for their safety. The Engineer's Team Members or Contractor's personnel will not use any platforms or scaffolds they consider unsafe or that does not have a yellow or red tag attached.

### **7.6.2 Purpose**

Work platforms and scaffolds have a multitude of safety considerations that must be attended to, or an equipment failure with severe injuries might result from the lack of this attention. Additionally, falls from these types of work surfaces account for a large percentage of deaths and serious injuries. As required by OSHA, 100% fall protection will be provided during the erection and dismantling of scaffold systems greater than 6 feet in height. Equipment maintenance, installation and fall protection are key safety purposes of this procedure. Scaffolds will be erected, dismantled and appropriately tagged under the direct supervision of a Competent Person.

Scaffolds must provide clearance with high voltage electric lines as required in Table 1 Section 7.22. Screening may be required at work platforms where employees may contact high voltage lines with tools or materials.

### 7.6.3 Definitions

1. Tube and Coupler Scaffold: An elevated platform assembly consisting of tubing which serves as posts, bearers, braces, ties, and runners. A base supporting the posts and special couplers which serves to connect the uprights, and to join the various members.
2. Tubular Welded Frame Scaffold: A sectional, panel or frame metal scaffold substantially built up of prefabricated welded sections which consist of posts and horizontal bearers with intermediate members. Panels or frames shall be braced with diagonal or cross braces.
3. Mobile Tubular Welded Scaffold: Tubular welded frame scaffolds mounted on heavy-duty castors having locks to preclude undesirable rolling.
4. Handrails: Horizontal pieces of pipe installed at a height of 42 to 45 inches above the working platform to protect personnel from falling.
5. Mid-Rails: Horizontal pieces of pipe installed knee high (approximately 21 inches) above the working platform to further protect personnel from falls.
6. Toe Boards: Horizontal 1-inch by 4-inch or wider boards mounted on edge to protect from tools rolling off the deck.
7. Planks: Wooden Planks 2-inch by 10-inch or wider used for scaffold decking at the working levels.
8. Ties and Bracing: Common construction wire used to tie scaffold to building etc. #12 wire may be used if doubled or a single looped #10 wire.
9. Cleats: Wooden "stops" attached to the bottom side of each end of the planks to prevent longitudinal movement of the planks.
10. Scaffold classification: Light duty scaffold should not exceed 25 psf, medium duty scaffold should not exceed 50 psf, heavy-duty scaffold should not exceed 75 psf.

### 7.6.4 Responsibility

1. The Engineer's Team Member and Contractor employees intending to use the scaffold shall be responsible for assuring that the scaffold and

all accessories comply with this standard before using the platform or scaffold. The scaffold will have a tag.

2. The employer will provide their supervisors with information related to compliance with regulations.
3. The Contractor must have a designated employee(s) knowledgeable of the scaffold requirements. Employees will be trained in assembling and disassembling the scaffolding. It is the responsibility of the "competent person" to ensure that the scaffolding is erected properly, inspected daily before each use, disassembled properly, and tagged accordingly when defective or not available for use.
4. The Contractor is responsible for Scaffold Permits and Engineered plans, when required.
5. Scaffold tagging changed from Red to Yellow, etc.

A tag will be placed on a scaffold approved by the "competent person". This tag must give the:

- a. Date tag was placed - date of the last inspection.
- b. Name of person inspecting. All tags must be weather resistant.

A **RED** tag means DANGER DO NOT USE and will be used for an incomplete scaffold. This tag must provide:

- a. The date tag was placed.
- b. The name of person inspecting.
- c. A brief description of condition and/or special instruction.

A **YELLOW** tag - Indicates the scaffold was complete upon inspection and tagging and contains SPECIAL INSTRUCTIONS - read before use and comply.

### 7.6.5 Implementation

#### 1. Inspections Tips

The following listed items are presented to provide employees a guide for inspection of the platforms and scaffolding before usage. When an Engineer's Team Member or contractor employee observes any item listed below, the person must notify his/her supervisor and not use the platforms or scaffolds before any deficiency is corrected.



- a. Step back and visually inspect a scaffold before each use.
- b. Inspect all equipment components before using. Never use equipment that is damaged or deteriorated in anyway. Damage or deteriorated equipment must be red-tagged.
- c. Avoid using rusted equipment, as its strength is not known.
- d. Inspect ground surface of proposed scaffold location for soil stability, levelness, obstructions, and electrical hazards. Screw jacks and mudsills must be used.
- e. Inspect all wood components for grade and strength any defective planks must be removed and tagged or marked - DO NOT USE.

Note: A plank with a full thickness, longitudinal crack 18" or greater will be removed from use.

- f. Inspect erected scaffolds regularly and before use to be sure they are maintained in a safe condition and that the base plates and mudsills have not settled. Inspections must be completed daily by the competent person and signed off before put into use.

## 2. General Requirements

- a. Review equipment for adequate mudsills for scaffold posts to distribute the load as required.
- b. Incomplete scaffolds will be RED tagged by the responsible Contractor. The DANGER tag should provide hazard warnings. A YELLOW tag will identify PPE and other special instructions required in order to use the scaffold. Contractor employees and Engineer will be instructed to read tags before using scaffolds. If a tag is not attached to the scaffold DO NOT USE the scaffold.
- c. Stationary metal scaffold legs shall rest upon manufacturer's adjustable steel base plates, mud sills are required when resting on earth to assure the safety factor of four is maintained. Screw jack base plates must always be used.
- d. Use adjusting screw jacks instead of blocking to adjust to uneven conditions.
- e. Plumb and level all scaffolds as the erection proceeds. Do not force braces to fit. Level the scaffold until proper fit can be made easily.

- f. Fasten all braces securely with manufacturer's securement pins, not nails.
- g. On wall scaffolds, place and maintain anchors securely between structure and scaffold at least every 20 feet of horizontal length and every 20 feet of vertical height.
- h. If scaffolds are to be partially or fully enclosed, specific precautions must be taken to assure frequency and adequacy of ties securing the scaffolding due to the increased load conditions resulting from the effects of wind, snow, and ice. The potential wind loading capability of scaffolds must be verified by an Engineer.
- i. Free-standing scaffold towers must be restrained from tipping by guying or other means. If it is higher than three times the least base dimension.
- j. All appropriate horizontal and diagonal braces must be installed before the scaffold can be used for work or inspection.
- k. Equip all planked or staged areas with guardrails 42 inches to 45 inches high, midrail approximately 21 inches high, and toe boards 4 inches in height along all open sides and ends of the scaffold platforms. The maximum deflection of the top rail when a load of 200 pounds is applied in any direction at any point on the top rail shall not exceed 3 inches.
- l. Scaffolds must be equipped with a scaffold ladder or equivalent safe means of access. Use landing platforms with all access ladders higher than 30 feet. Offset the ladder location at each landing. Single or double cleat ladders shall not exceed 30 feet in length. Climbing devices or other means of fall protection are required for any ladder over 24 feet.
- m. Take appropriate precautions to avoid power lines and electrical conductors.
- n. All planking shall be scaffold grade as recognized by grading rules for the species of wood used. The maximum permissible span for 1-1/4-inch by 9-inch or wider planks of full thickness is 4 feet with medium loading of 50 pounds per square foot. The maximum permissible spans for 2-inch by 9-inch or wider planks shall conform with Attachment 3-12.

- o. Platform planks shall be laid with their edges close together so the platform will be tight, with no spaces through which tools or parts can fall. All scaffold platforms shall be at least two planks wide. Laminated planking (plywood) of equivalent strength of scaffold grade planking may be placed over planks to eliminate spaces created when the platform is built around piping or other obstructions.
- p. Where planking is lapped, each plank shall lap its support at least 12 inches and be secured from movement with #9 wire or equivalent.
- q. Scaffold planks shall extend over their end supports not less than 6 inches nor more than 12 inches and shall have cleats or be otherwise secured.
- r. All scaffolding accessories shall be used and installed in accordance with manufacturer's recommended procedures. Scaffolds, frames, and their components manufactured by different companies shall not be intermixed.
- s. Where persons are required to work or pass under the scaffold, scaffolds shall be provided with a screen between the toeboard and the guardrail extending along the entire opening consisting of #18 gauge U.S. standard wire 2-inch mesh or the equivalent.

### 3. Mobile Scaffolds

- a. The height of rolling scaffolds must be equal to or less than three times the minimum base dimension. Outriggers may be installed to increase the minimum base dimensions.
- b. Locking devices must be installed on casters and locked prior to personnel using the scaffold. At least two of the casters shall be swivel type.
- c. Tools and material shall be removed or secured prior to moving the scaffold tower. Personnel must not be on the scaffold while the scaffold is being moved.
- d. A dedicated spotter must be used if tower could potentially be moved within 10 feet of any overhead power lines.

#### 4. Instruction of Personnel

All personnel should be knowledgeable in the proper and safe use of work platforms or scaffolding. Instruction will include, but not be limited to the following guidelines:

- a. Follow instruction on scaffold tag.
- b. Do not climb on scaffold bracing unless it is designed and documented by the manufacturer for this purpose.
- c. Do not use ladders, buckets or other makeshift devices on top of scaffolds to increase the height.
- e. Do not move rolling scaffolds with people or loose materials on them, unless conditions comply with those outlined by the manufacturer and OSHA.
- f. Keep your weight inside the scaffold tower while working.
- g. Do not carry tools or parts in your hands or pockets when ascending the access ladder. Utilize tool belts, tool bucket, and rope or other acceptable means to raise and lower such items.
- h. Do not throw any scrap materials down from elevated locations. Lower objects with rope or use other acceptable means.
- i. Scaffolds shall not be used for storage of material, except material currently being used.
- j. Do not overload scaffolds. (Refer to 7.6.4, J)
- k. Ladders or equivalent safe access shall be provided for employee entry onto the scaffold deck level.

#### 5. Work Platforms

- a. Temporary and permanent platforms shall be equipped with standard protective rails and toeboards when the floor of the platform exceeds 6 feet.
- b. If because of the confined work location protective rails cannot be installed, an employee may use a fall arrest system, independently secured to a building or structure, free of the platform and/or platform support devices, if approved by the competent person and indicated on the YELLOW scaffold tag.

- c. Platforms must be securely installed and not overloaded. Platforms will be kept clear of tripping and slipping hazards. All hoses and cords shall be secured every 15 feet.
- d. Contractor/Subcontractor "Competent Person(s)" must review the completed platform installation prior to use and place the appropriate tag.
- e. When installing a platform the operational task must be considered to make sure correct support devices are used, i.e., wire cable supports instead of hemp rope for a welding/cutting operation.
- f. Bracket Scaffold (no tagging required)

## **7.7 Walking and Working Surfaces**

### **7.7.1 Policy**

All work areas on the project shall have walking and working surfaces free of conditions that pose tripping and/or falling hazards.

### **7.7.2 Purpose**

Falls are the number one contributor to construction workers' serious and fatal injuries. The Engineer and Contractors will consider maintenance of project walking and working surfaces a pivotal part of their safety and health program. If an Engineer or Contractor employee observes any conditions on a walking or working surface that poses a tripping and/or falling hazard, he/she will notify his/her supervisor. The Contractor is responsible for their worksite safety. When a walking or working surface deficiency is observed, the responsible Contractor will immediately correct the deficiency. A scaffold will be "**Red Tagged**" until corrected.

### **7.7.3 Scope**

The safety requirements listed within this section pertain to construction activities only and are not to be used as design criteria for permanent structures. They cover construction work area conditions where there is danger of personnel or materials falling through floor, roof or wall openings, or from stairways or runways.

#### 7.7.4 Implementation

##### 1. Standard Specifications

If guardrail or protective covers are required for tripping and falling hazards these devices shall be installed in accordance with the specifications below.

##### a. Standard Protective Railings

A standard railing shall consist of top rail, intermediate rail, toeboard, and posts, and shall have a vertical height of approximately 42 inches to 45 inches from upper surface of top rail to floor, platform runway or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rail shall not overhang the terminal posts except where such overhang does not constitute a projection hazard. Minimum requirements for standard railing under various types of construction are specified in the following paragraphs:

- b. For wood railings, the posts shall be of at least 2-inch by 4-inch stock spaced not to exceed 8 feet; the top rail shall be of at least 2-inch by 4-inch stock; the intermediate rail shall be of at least 1-inch by 6-inch stock.
- c. For pipe railings, posts and top intermediate railings shall be at least 1-1/2 inches nominal diameter with posts spaced not more than 8 feet on centers.
- d. For structural steel railings, posts and intermediate railings shall be at least 1-1/2 inches nominal diameter with posts spaced not more than 8 feet on centers.
- e. The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail, with a minimum of deflection.
- f. Railings receiving heavy stresses from employees' trucking or handling materials shall be provided with additional strength by the use of heavier stock, closer spacing of posts, bracing, or by other means.

- g. Other types, sizes, and arrangements of railing construction are acceptable, provided they meet the following conditions:
- A smooth-surfaced top rail at a height above floor, platform, runway, or ramp level of 42 inches to 45 inches.
  - Strength to withstand at least the minimum requirements of 200 pounds top rail pressure with a minimum of deflection.
  - Protection between top rail and floor, platform, runway, ramp, or stair treads, equivalent at least to that afforded by a standard intermediate rail.
- h. Half-inch wire rope shall be considered as meeting project requirements when installed to protect against the hazards of open-sided floors with the following additional requirements.

Note: Wire rope railing shall not be used as part of a fall arrest system unless so designed).

- Cable must be maintained with a minimum deflection (three inches or less) through the use of turnbuckles or other equally effective device.
  - Cable shall be supported on eight-foot centers where maintenance of the minimum deflection requirements is not possible. Cable must still have three inches or less deflection.
  - On five-foot centers, highly visible flagging such as surveyors tape shall be used to increase visibility of the cable.
  - The cable shall be two-inch. Half-inch cable should be the standard due to the larger diameter affording a larger gripping surface to the hand.
  - Three clamps will be used at all connections. Proper installation of these clamps is required. (“Never saddle a dead horse”)
- i. Stair Railings

A stair railing shall be of construction similar to a standard railing, but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

j. Standard Toeboards

- A standard toeboard shall be 4 inches minimum in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and have not more than 1/4-inch clearance above floor level. It may be made of any substantial material, either solid or with openings not over 1 inch in greatest dimension.
- Where material is piled to such height that a standard toeboard does not provide protection, paneling or screening from edge of standard toeboard to intermediate rail or to top rail shall be provided.

k. Standard Handrails

- A standard handrail shall be of construction similar to a standard railing except that it is mounted on a wall or partition, and does not include an intermediate rail. It shall have a smooth surface along the top and both sides of the handrail. The handrail shall have an adequate handhold for anyone grasping it to avoid falling.

Duplex nails shall not be used and the ends of the handrail shall be constructed so as not to constitute a projection hazard.

- The height of handrails shall be not more than 34 inches nor less than 30 inches from upper surface of handrail to surface of tread, in line with face of riser or to surface ramp.
- All handrails and railings shall be provided with a clearance of approximately 3 inches between the handrail or railing and any other object.

l. Floor Opening Covers

Floor opening covers shall be of any material that meets the following strength requirements:

- Conduits, trenches, and manhole covers and their supports, when located in roadways and vehicular aisles, shall be designed to carry a truck rear-axle load of at least two times the maximum intended load.



- The floor opening cover shall be capable of supporting the maximum intended load and so installed as to prevent accidental displacement.
- All floor opening covers will be properly marked and secured.

m. Skylight Openings

- Skylight openings that create a falling hazard shall be either guarded with a standard railing or covered.

n. Wall Opening Protection

- Barriers shall be of such construction and mounting that, when in place at the opening, the barrier is capable of withstanding a load of at least 200 pounds applied in any direction (except upward), with a minimum of deflection at any point on the top rail or corresponding member.
- Screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied horizontally at any point on the near side of the screen. They may be of solid construction, of grill work with openings not more than 8 inches long, or of slat work with openings not more than 4 inches wide with length unrestricted.

2. Flooring Requirements

a. Permanent Flooring

The permanent floors shall be installed as the erection of structural members progresses, and there shall be not more than eight stories between the erection floor and the uppermost permanent floor, except where the structural integrity is maintained as a result of the design.

b. Temporary Flooring

- The derrick or erection floor shall be solidly planked or decked over its entire surface except for access openings. Planking or decking of equivalent strength shall be of proper thickness to carry the working load. Planking shall be not less than 2 inches thick, full-size and undressed, and shall be laid tight and secured to prevent movement.

- On buildings or structures not adaptable to temporary floors, and where scaffolds are not used, safety nets shall be installed and maintained whenever the potential fall distance exceeds two stories or 25 feet. The nets shall be hung with sufficient clearance to prevent contacts with surface of structures below.
- Floor periphery - safety railing. A safety railing of 2-inch wire rope or equal shall be installed approximately 42 inches high around the periphery of all temporary planked or temporary metal-decked floors of tier buildings and other multi-floored structures during structural steel assembly. On each floor, immediately after structural steel assembly, an intermediate railing must be installed, with toeboards where needed.
- Where steel erection is being done, a tightly planked and substantial floor must be maintained within two stories or 30 feet, whichever is less, below and directly under that portion of each tier of beams on which any work is being performed, except when gathering and stacking temporary floor planks on a lower floor, in preparation for transferring such planks for use on an upper floor. Where such a floor is not practicable, subsection 2 of this section applies.
- When gathering and stacking temporary floor planks, the planks must be removed successively, working toward the last panel of the temporary floor so that the work is always done from the planked floor.
- When gathering and stacking temporary floor planks from the last panel, the employees assigned to such work shall be protected by a full body harness with safety lines attached to a substantial anchorage.

c. Flooring - Other Construction

- In the erection of a building having double wood floor construction, the rough flooring shall be completed as the building progresses, including the tier below the one on which floor joists are being installed.
- For single wood floor or other flooring systems, the floor immediately below the story where the floor joists are being installed shall be kept planked or decked over.

3. Guarding of Floor Openings and Floor Holes

- a. Floor openings shall be guarded by standard railings with standard toeboards or cover, as specified in subpart A of this section. In general, a railing shall be provided on all exposed sides, except at entrances to stairways.
- b. Ladderway floor openings or platforms shall be guarded by standard railings with standard toeboards on all exposed sides, except at entrance to opening, with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening.
- c. Hatchways and chute floor openings shall be guarded by one of the following:
  - Hinged covers of standard strength and construction and a standard railing with only one exposed side. When the opening is not in use, the cover shall be closed or the exposed side shall be guarded at both top and intermediate positions by removable standard railings.
  - A removable standard railing with toeboard or not more than two sides of the opening and fixed standard railings with toeboards on all other exposed sides. The removable railing shall be kept in place when the opening is not in use and should preferably be hinged or otherwise mounted so as to be conveniently replaceable.
- d. Wherever there is danger of falling through a skylight opening, it shall be guarded by a fixed standard railing on all exposed sides or a cover capable of sustaining a load of at least 200 lbs applied in any direction, with a minimum of deflection.
- e. Pits and trap-door floor openings shall be guarded by floor opening covers of standard strength and construction. While the cover is not in place, the pit or trap openings shall be protected on all exposed sides by removable standard railings.
- f. Manhole floor openings shall be guarded by standard covers which need not be hinged in place. While the cover is not in place, the manhole opening shall be protected by standard railings.
- g. Temporary floor openings shall have standard railings or covers installed.

- h. Floor holes, into which persons can accidentally walk, shall be guarded by either a standard railing with standard toeboard on all exposed sides, or a floor hole cover of standard strength and construction that is secured against accidental displacement. While the cover is not in place, the floor hole shall be protected by a standard railing.
- i. Where doors or gates open directly on a stairway, a platform shall be provided, and the swing of the door shall not reduce the effective width of the platform to less than 20 inches.

4. Guarding of Wall Openings

- a. Wall openings, from which there is a drop of more than 4 feet, and whose bottom is less than 3 feet above the working surface, shall be guarded as follows:
  - When the height and placement of the opening in relation to the working surface is such that either a standard rail or intermediate rail will effectively reduce the danger of falling, one or both shall be provided.
  - The bottom of a wall opening, which is less than 4 inches above the working surface, regardless of width, shall be protected by a standard toeboard or an enclosing screen solid construction.
- b. An extension platform outside a wall opening onto which materials can be hoisted shall have side rails or equivalent guards of standard specifications. One side of an extension platform may have removable railings in order to facilitate handling materials.
- c. When a chute is attached to an opening, the provisions of paragraph 1, Subpart D shall apply, except that a toeboard is not required.

5. Guarding of Open-sided Floors, Platforms and Runways

- a. Every open-sided floor or platform 6 feet or more above adjacent floor or ground level shall be guarded by a standard railing or the equivalent on all open sides, except where there is an entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a standard toeboard to facilitate the passage of persons beneath the open sides or wherever there is moving machinery, or equipment producing hazardous falling materials.

- b. Runways shall be guarded by standard railings or the equivalent on all sides 4 feet or more above floor or ground level. Wherever, tools, machine parts, or materials are likely to be used on runways, toeboards shall also be provided on all exposed sides.
- c. Where any person entering upon runways becomes exposed to machinery, electrical equipment, or other danger from a falling hazard, additional guarding shall be provided by the Contractor. Engineer's Team Members are to notify their supervisor of the need for the additional guards.
- d. Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, such as, pickling or galvanizing tanks, degreasing units, and similar hazards, shall be guarded with standard railings and toeboards.

6. Stairway Railings and Guards

Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails as specified below, the width of the stair to be measured clear of all obstructions except handrails:

- a. On stairways less than 44 inches wide having both sides enclosed and at least one handrail.
- b. On stairways less than 44 inches wide having one side open, at least one stair railing and on the intermediate stair railing located approximately midway on the open side.
- c. On stairways 88 or more inches wide, one handrail on each enclosed side, one stair railing on each open side, and one intermediate stair railing located approximately midway.

7. Stairways

On all structures of two or more floors (20 feet or more) in height, stairways, ladders or ramps must be provided for employees during the construction periods. Stairways must meet the following requirements:

- a. Rise height and tread width must be uniform throughout any flight of stairs including any foundation structures used as one or more treads of the stairs.

- b. Temporary stairs must have a landing not less than 30 inches in the direction of travel at every 12 feet of vertical rise.
- c. Permanent steel or other metal stairways and landings with hollow pan-type treads that are to be filled with concrete or other materials when used during construction, must be filled to the level of the nosing with solid material. The requirement shall not apply during the period of actual construction of the stairways themselves.
- d. Metal landings must be secured in place before filling.
- e. Wooden treads for temporary service must be full width.
- f. All parts of stairways must be free of hazardous projections, such as protruding nails.
- g. Stairway railings and guardrail must meet the requirement of subpart F of this section.
- f. All stairs shall have minimum illumination intensities of 5 foot-candles.
- g. Debris and other loose materials shall not be allowed on, under, or at approaches and landings to stairways.
- h. Slippery conditions on stairways shall be eliminated as soon as possible after they occur.
- i. Spiral stairways shall not be permitted except for special limited usage and secondary access situations where it is not practical to provide a conventional stairway.

8. Barrier Identification Tape

Barrier identification tape is strictly prohibited from being used for any form of personnel fall protection. Barricade tape around excavation can be used for short term (24 hours), after this period physical barriers are required.

- a. YELLOW barricade tape shall be used for CAUTION/WARNING
- b. RED barricade tape shall be used for DANGER DO NOT ENTER

Note: Once the area barricaded is free of the hazard(s) for which it was erected the tape will be removed and properly discarded.

## 7.8 Fall Protection

### 7.8.1 Policy

The Engineer and Contractor employees shall not be exposed to fall hazards. When an employee observes a fall hazard, he/she will notify his/her supervisor of the hazard. The responsible Contractor will immediately correct the hazard.

### 7.8.2 Purpose

The purpose of this section is to minimize the risk of injury to site personnel from fall hazards.

### 7.8.3 Responsibility

Each Contractor is responsible for meeting fall protection requirements in their overall safety and health program.

Each Contractor is required to evaluate **ALL** fall exposure conditions or tasks and must develop a **Comprehensive Fall Protection Program** which outlines what methods, procedures and/or devices will be used in their program. This program will suffice for a JSA... in most cases. This evaluation and program must be in writing and must be submitted to the UDOT Safety Risk Manager. Acceptance by the Engineer is required **PRIOR** to employee exposure. Any Contractor failing to prepare this evaluation and program will be considered to be in non-compliance and the Engineer will take appropriate action. The UDOT Safety Risk Manager may assist the Contractor in the development of a Comprehensive Fall Protection Program, evaluation and training program. Contact the UDOT Safety Risk Manager for assistance and questions.

**Note: Full body harnesses are the only acceptable personal protective device for employees exposed to a fall condition as approved for use in a Fall Arrest System.**

### 7.8.4 Implementation

Each Contractor is responsible for implementing the requirements to achieve fall protection in accordance with all Federal, State, local rules, regulations, and **The UDOT Safety and Health Plan**.

1. Approved fall protection equipment or devices shall be used by all employees working where there is a danger of falling. Fall protection systems must be designed and installed under the direction of a Registered Professional Engineer. Fall protection is required, as a minimum, under the following examples:

- a. Formwork and reinforcing steel. Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet (1.8 m) or more to lower levels by Personal Fall Arrest Systems, safety net systems, or positioning device systems. This requires continuous fall protection (this means while moving and working) unless documented OSHA variance or other documentation has been accepted by the UDOT Safety Risk Manager.
  - b. When working from a telescopic, articulating, or rotating type man lifts, personnel must always wear a full body harness, secured to an approved anchorage point located in the lift.
  - c. When working on a ladder higher than 6 feet from a solid surface, if the employee's torso extends past the side rails or if a vertical ladder extended a total of 20' or greater.
  - d. When working on a platform or other support not equipped with adequate guardrail, which is higher than 6 feet from a solid surface. In some cases guardrail or other means of fall protection may be required at 4 feet.
  - e. When working from a crane-suspended (must be approved by the UDOT Safety Risk Manager) work platform, a body harness is mandatory.
  - f. When an employee may have to be lowered into or raised from a confined space, a body harness will be worn. The employee will be supported by an approved platform or a boatswain's chair, with certified hoisting device and fall arrest device.
  - g. When working adjacent to an unguarded floor opening or sloped roof, a lifeline system is desirable for mobility. A positive means of fall protection must be provided unless it can be proven infeasible.
  - h. When working adjacent to a deep excavation, pit or trench. Barricade tape is not adequate fall protection.
2. Employees will be instructed on the proper wearing and use of personal Fall Protection Arresting Device Systems.
3. A static lifeline is a horizontal line attached between at least two fixed anchorages, independent of the work surface, to which a lanyard is secured. A lifeline must be constructed of wire rope (cable), at least 2 inch in diameter. It must be capable of supporting a dead weight of 5000 lbs at its center for each person utilizing the lifeline.



4. A lanyard is a maximum 6-foot-long piece of flexible line rated for 5000 pounds used to secure the wearer of an approved safety belt or harness to a lifeline or fixed anchorage. Shock absorbing lanyards are a simple means to reduce the force of a fall. Note: the body force limits must be considered when selecting personal fall arrest devices.
5. A major problem with lanyard snap hooks is the possibility of "Rollout" or unlatching during shock or static loading by a twisting action. Locking snap lanyard hooks or similar design hooks such as carabiner type snap hooks with automatic twist lock arm or other locking device are required on all safety lanyards. Including those used as part of a Positioning Device System in reinforcing steel placement. **Only hooks with locking snaps that operate in as-new condition will be used.** Continued workers education is necessary. Users should not rely on sound of a snap closing, they should check the connection visually. Regular maintenance checks are required.
6. Wire rope must not be used for lanyards, unless a shock absorbing device, such as a "Dyna-Brake," is used in the system. Without such a device, the rigidity of the cable greatly increases the effect of the impact load in the event of a fall and exceeds the OSHA 1800 pound maximum body loading standard.
7. Knots shall not be made in rope lanyards as strength is greatly reduced by knots.
8. Lanyards shall not be lengthened by connecting two snap hooks together as the possibility of a "roll-out" exists and this may exceed design limitations.
9. Supervisors shall ensure that equipment inspections are performed by employees before each use. Harnesses and lanyards that have been subjected to impact loading shall be removed from service by the responsible Contractor and be destroyed to eliminate the possibility of using them at a later date.
10. To maintain their service life, harnesses and lanyards shall be inspected frequently by the Contractor (Competent Person). At minimum a written quarterly inspection will be conducted (see Appendix H). Regular inspection for wear, damage or corrosion shall be a daily requirement and the personal protective equipment (PPE) shall be discarded by the Contractor if excessive wear is determined. The following recommended inspection and maintenance procedures shall be administered by the responsible Contractor:

## **FULL BODY HARNESS INSPECTION**

For harness inspection, perform the following procedures for all harness straps.

### **Belts and rings**

Beginning at one end, holding the body side of the belt toward you, grasp the belt with your hands 6 to 8 inches apart. Bend the belt in an inverted "U" as shown (Fig. 1). The surface tension resulting makes damaged fibers or cuts easier to see. Follow this procedure the entire length of the belt or harness. Watch for frayed edges, broken fibers, pulled stitches, cuts or chemical damage.

### **Dee Rings**

Check dee rings and dee metal wear pad (if any) for distortion, cracks, breaks, and rough or sharp edges (Fig. 2). The dee ring bar should be at a 90° angle with the long axis of the belt and should pivot freely.

### **Attachments of Buckles and Dee Rings**

Attachments of buckles and dee rings should be given special attention. Note any unusual wear, frayed or cut fibers, or distortion of the buckles or dees (Fig. 3). Rivets should be tight and unmovable with fingers. Body side rivet base and outside rivet burr should be flat against the material. Bent rivets will fail under stress.

### **Inspect for Frayed or Broken Strands**

Broken webbing strands generally appear as tufts on the webbing surface. Any broken, cut or burned stitches will be readily seen. (See page 15 for detailed chart on visual inspection for chemical, heat and corrosive damage.)

### **The Tongue or Billet**

The Tongue or billet of the belts receives heavy wear from repeated buckling and unbuckling. Inspect for loose, distorted or broken grommets (Fig. 4). Belts should not have additional, punched holes.

### **Tongue Buckle**

Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Roller should turn freely on frame. Check for distortion or sharp edges (Fig. 5).

### **Friction Buckle**

Inspect the buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment points of the center bar (Fig. 6).

## **LANYARD INSPECTION**

When inspecting lanyards, begin at one end and work to the opposite end. Slowly rotate the lanyard so that the entire circumference is checked. Spliced ends require

particular attention. Hardware should be examined under procedures also detailed below, i.e., snaps, dee ring and thimbles.

## **Hardware**

### **Snaps**

Inspect closely for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should seat into the nose without binding and should not be distorted or obstructed (Fig. 7). The keeper spring should exert sufficient force to firmly close the keeper. Keeper locks must prevent the keeper from opening when the keeper closes.

### **Thimbles**

The thimble must be firmly seated in the eye of the splice, and the splice should have no loose or cut strands. The edges of the thimble must be free of sharp edges, distortion, or cracks (Fig. 8).

### **Steel Lanyard**

While rotating the steel lanyard watch for cuts, frayed areas, or unusual wearing patterns on the wire (Fig. 9). Broken strands will separate from the body of the lanyard.

### **Web Lanyard**

While bending webbing over a pipe or mandrel, observe each side of the webbed lanyard (Fig. 10). This will reveal any cuts or breaks. Swelling, discoloration, cracks, charring are obvious signs of chemical or heat damage. Observe, closely for any breaks in the stitching.

### **Rope Lanyard**

Rotation of the rope lanyard while inspecting from end-to-end will bring to light any fuzzy, worn, broken or cut fibers (Fig. 11). Weakened areas from extreme loads will appear as a noticeable change in original diameter. The rope diameter should be uniform throughout, following a short break-in-period.

### **"Sofstops" or "Dyna-Brake" Shock Absorbing Device**

The outer portion of the pack should be examined for burn holes-and tears (Fig. 12). Stitching on areas where the pack is sewn to dee rings, belts, or lanyards should be examined for loose strands, rips, and deterioration.

**\*The Contractor is required to complete a monthly Safety Belt, Lanyard and Harness Inspection record and provide documentation to the Engineer. An example of a Safety Belt, Lanyard and Harness Inspection Record is enclosed in Appendix H.**

## VISUAL INDICATIONS OF DAMAGE TO WEBBING AND LANYARDS

<u>Type of Webbing</u>	<u>Heat</u>	<u>Chemical</u>	<u>Molten Metal or Flame</u>	<u>Paint and Solvents</u>
Nylon & Cordura	In excessive heat, nylon becomes brittle and has a shriveled brownish appearance. Fibers will break when flexed. Should not be used above 200 degrees F.	Change in color usually appearing as a brownish smear or smudge. Transverse cracks when belt is bent over mandrel. Loss of elasticity in belt.	Webbing strands fuse together. Hard shiny spots. Hard and brittle feel. Will not support combustion.	Paint which penetrates and dries restricts movement of fibers. Drying agents and solvents in some paints will appear as chemical damage.
Polyester	Same as nylon, except do not use above 180 degree F.	Same as nylon.	Same as nylon, except will support combustion.	Same as nylon.

NOTE: Lanyards made of nylon rope will show the same visual indications of damage as nylon webbing. Likewise, lanyards made of polyester rope will show the same visual indications as polyester webbing.

### CLEANING

Basic care of all safety equipment will prolong the durable life of the unit and will contribute toward the performance of its vital safety function. Proper storage and maintenance after use are as important as cleansing the equipment of dirt, corrosives, or contaminants. Storage areas should be clean, dry and free of exposure to fumes or corrosive elements.

- a. Nylon and Polyester - Wipe off all surface dirt with a sponge dampened in plain water. Squeeze the sponge dry. Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a thick lather, with a vigorous back and forth motion. Then wipe the belt dry with a clean cloth. Hang freely to dry, but away from excessive heat.
- b. Drying - Belts and other equipment should dry thoroughly without close exposure to heat, steam, or long periods of sunlight.

**System Components** - Only components that are fully compatible with one another should be used. Fall arrest systems are designed and tested as complete systems and should be used in this way.

**What To Do After a Fall** - If a fall occurs, all components of the fall arrest system should be discarded. A fall substantially decreases the strength of all parts of the system, so all components should be replaced after a fall.

11. Safety nets may be used as another form of protection from fall injuries.
  - a. Safety nets will be used whenever the use of safety belts and lifelines is impractical or unfeasible and protection from falls is required.
  - b. Where safety nets are used, extra care must be taken to arrange the nets so sufficient clearance exists to prevent the nets from contact with the ground or other surfaces below or the sides when the anticipated impact load is caught by the nets.
  - c. When more than one net are joined to form a larger net, they should be laced or otherwise secured so they perform properly. For all nets, perimeter suspension should be designed and installed in such a manner that the suspension points are either level or slope toward the building or structure so a rebounding load will not be directed out of the netting. Perimeter nets should not be more than 25 feet below the working level.
  - d. Daily inspection of nets are required. Inspections shall be made prior to and after installation, after any alterations and after impact loading.
12. The Fall Protection Program shall detail in writing when fall protection is required and exactly how this protection is to be provided. This written program is required for any Contractor exposing workers to falls 6 feet or greater. The written Fall Protection Program must be submitted, reviewed, and accepted, by the UDOT Safety Risk Manager prior to the start of work, and/or employee exposure. The Engineer's Team Members will be instructed and abide by the Contractors program.

#### **7.8.5 Training Requirements**

1. The Contractor shall prepare a written training program to ensure that each employee who **might** be exposed to a fall hazards is **knowledgeable of the Fall Protection Program** requirements. The program shall enable each employee the ability to recognize the hazards of falling and shall train each employee in the procedures to

be followed in order to eliminate or minimize these hazards.

2. The Contractor shall assure that each employee has been trained, as necessary, by a **Competent Person** (the name of the Competent Person must be submitted to the Engineer) qualified in the following areas:
  - a. Complete understanding of all Federal, State, Local and **The Project** Fall Protection Regulations;
  - b. The nature of fall hazards in the work area;
  - c. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
  - d. The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used;
  - e. The role of each employee in the safety monitoring system when this system is used; (Note: to use this system the contractor must prove, in writing that it is not feasible or it is more hazardous to use other methods of Fall Protection.)
  - f. The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs;

#### **7.8.6 Certification of Training**

The Contractor shall verify compliance with paragraph 1 and 2 (above), by preparing a written certification record which shall contain:

1. The name of the employee trained.
2. The date of the training
3. The signature of the person who conducted the training and the employer.

The latest training certification shall be maintained at the job site and available for review by the Engineer.

#### **7.8.7 Retraining**

When the employer or Engineer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by paragraph (a) of this section, the employer shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situation where:

1. Changes in the workplace render previous training obsolete; or
2. Changes in the type of fall protection systems or equipment to be used render previous training obsolete; or
3. Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill. Retraining and documentation of the retraining will be required for any person prior to further exposure. If further fall protection violations are observed upon completion of the retraining disciplinary actions shall be imposed up to and including permanent removal from the project.

These records must be maintained at the job site and available for review by the Engineer.

Note: Personnel who have been trained, then re-trained and continue to violate the established fall protection program/regulations will be removed from the project **IMMEDIATELY**.

#### **7.8.8 Definitions**

1. Anchorage means a secure point of attachment for lifelines, lanyards or deceleration devices capable of 5000 lbs of force in a full arrest situation and 3000 lbs when used as a part of an approved positioning system per employee.
2. Connector means a device used to couple (connect) parts of the personal fall arrest system and positioning device system together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or dee-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).
4. Controlled access zone (CAZ) means an area in which certain work (e.g., overhand bricklaying) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.
5. Deceleration device means any mechanism, such as a rope grab, rip-

stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

6. Deceleration distance means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.
7. Equivalent means alternative design, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.
8. Free fall means the act of falling before a personal fall arrest system begins to apply force to arrest the fall.
9. Free fall distance means the vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.
10. Infeasible means that it is **impossible** to perform the construction work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.
11. Leading edge means the edge of a floor roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.
12. Lifeline means a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to an anchorages at both ends to stretch horizontally



(horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

13. Personal fall arrest system means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a full body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.
14. Position Device System requires that the employee is not exposed to a fall of greater than 2 feet. This system is not considered adequate as a Fall Arrest System.

## **7.9 Ladders**

### **7.9.1 Policy**

Continuous fall protection must be maintained. Exceptions are listed in 29 CFR 1926 Subpart M. These are the only exceptions unless written OSHA variance is submitted.

All ladders used at the project site shall be free of defects, correctly positioned, properly secured, and stored when not in use.

### **7.9.2 Purpose**

The purpose of this section is to establish control over ladders provided by the Contractors for use on the project to minimize the risk of injury due to ladder deficiencies and/or failure. The Engineer will use the ladders provided by the Contractors. If an employee observes a deficiency with a ladder, he/she will notify his/her supervisor. The ladder will be **RED TAGGED** until it can be repaired or removed from service. It is the Contractor's responsibility to purchase and use these tags.

### **7.9.3 Implementation**

Each Contractor is responsible for implementing the following ladder requirements:

#### **1. Ladder Construction**

Ladders brought onto the project site will meet the following minimum requirements:

- a. All step ladders should be Type 1 - Industrial. Employers should obtain manufacturer recommended service weight and restrictions on all straight portable and extension ladders. These should have a working rate of up to 275 pounds.

- b. Stepladders will be no longer than 20 feet and will have a locking device that will hold the front and back in place. Step spacing will be no more than 12 inches. The inside minimum width at the top shall be 11-1/2 inches and the side rails shall spread one inch across the steps for each one-foot length. Step ladders will only be used in the fully open and locked position.
- c. A single portable straight ladder shall be no longer than 20 feet.
- d. Extension ladders shall be no longer than 30 feet.
- e. Made of a non-conductive type of material.
- f. All ladders must have skid resistant feet or other suitable devices to prevent slipping.

## 2. Ladder Maintenance

- a. Ladders are to be maintained in good condition at all times, joints tight, hardware and fittings securely attached, and movable parts to operate freely without binding or undue play. Defective ladders must be "tagged" out of service.
- b. Metal bearings shall be frequently lubricated.
- c. Frayed or badly worn draw rope shall be replaced.
- d. Safety feet shall be kept in good condition.
- e. Rungs shall be kept free of dirt and accumulations of paint, oil, grease and ice.
- f. Ladders are to be visually inspected for possible signs of defects before each use.
- g. No alterations or modifications can be made to any portable ladders.
- h. Ladders shall not be painted (paint may hide serious defects).

## 3. Use of Ladders

At a minimum the following safety precautions shall be observed before personnel use ladders:

- a. Person ascending or descending a ladder shall face the ladder.
- b. Where possible portable rung ladders shall be set up so that the horizontal distance from the top support to the foot of the ladder is one quarter of the working length of the ladder. The ladder shall be secured by tying off or other means, or held in place while in use.
- c. At least two persons shall be used to position large ladders -- one person shall hold it in place until the other person has secured the ladder. If the ladder is on a surface where slipping could occur, an individual shall hold it in place until the work is completed. Toe plates will be used to support the feet of the ladder when used on soft surfaces.
- d. Ladders shall not be placed in front of doors unless the door is blocked or guarded.
- e. No more than one person is to be on the ladder at a time.
- f. Supplies or equipment shall not be carried by a worker on the ladder. A rope, block and pulley, or other safe methods shall be used to transfer the material.
- g. If a ladder is used to gain access to a roof or platform, the side rails shall extend at least three feet beyond the point of support.
- h. Ladders shall not be placed on boxes, drums, or other unstable bases to obtain additional height.
- i. The top and the top three steps of a step ladder shall not be used as steps. Ladders must extend at least 36 inches beyond the landing surface.
- j. Extension ladders should be erected so that the upper section overlaps the bottom section by at least four rungs. All adjustments are to be made from the ground.
- k. Ladders located in trenches must be located within 25 feet of the employee's work location.
- l. Only non-conductive ladders shall be allowed on UDOT projects. Any ladders must be rated 1A or greater.

## **7.10 Confined Space Entry (CSE)**

(Refer to Appendix D, Confined Space Entry Checklist)

### **7.10.1 Policy**

All Engineer, Contractor employees and outside visitors/vendors required to enter a confined space must be fully knowledgeable of the requirements of this section. Prior to the start of such an entry, a Confined Space Checklist (CSC) and a Job Safety Analysis (JSA) (see Section (7.5)) will be completed. The Contractor involved in the work will develop a Confined Space Entry Procedure. This procedure will be submitted to the Engineer/UDOT Safety Risk Manager for review and acceptance prior to the start of work. The Contractor will train all personnel who will enter the confined space, no one will enter the confined space area until properly instructed.

### **7.10.2 Purpose**

To establish positive control to minimize risk associated from employees conducting a Confined Space Entry (CSE) under normal operating conditions.

### **7.10.3 Objectives**

The objectives of this section are to:

1. Prevent inadvertent operation of equipment and/or work process while people are working in the confined space.
2. Eliminate unexpected exposure to hazardous materials, oxygen deficient or inert/toxic gaseous atmosphere while working in confined spaces.
3. Plan for a timely and effective response to an emergency during a CSE.

### **7.10.4 Definitions**

1. Confined Spaces - Areas with limited entry and exit, or poor natural ventilation, and not intended for human occupancy. Examples of a confined space include: tanks, covered basins, vaults, columns, mixers, manholes, HVAC systems, boilers, pipelines, sumps, ditches or excavations. The practice of looking into a confined space through an open manway is not a CSE. All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise.

2. Safety Considerations - Include but are not limited to: atmosphere testing for gaseous conditions/lack of oxygen, appropriate personal protective and emergency equipment, additional personnel as needed to assure communications and assist the individual conducting the entry.
3. Confined Space Checklist (CSC) - A document to be included within the requirements of a JSA. CSC will be completed by the project supervision in charge of the entry. A sample CSC and CSC for Sewer Entry and a CSE Permit are presented in Appendix D.
4. Permit Required Confined Space - (see Appendix D for checklist. Contractors will provide their own permit). This means confined space that has one or more of the following:
  - a. May or may not potentially contain a hazardous atmosphere;
  - b. Contains a material that has potential for engulfing entrant;
  - c. Has internal configuration that could trap the entrant;
  - d. Contains any other recognized serious health or safety hazard;
5. Non-Permit Required Confined Space - a confined space that does not contain or with respect to atmospheric hazards, the potential of causing death or serious physical harm.

#### **7.10.5 Implementation**

1. Preparation of the CSC
  - a. Each section of the CSC must be completed. The CSC may be altered to provide more space for the sections requiring more information, or shortened as conditions dictate. Variables and special conditions will be additionally written in, as required. A Contractor may use their own form after review by the UDOT Safety Risk Manager.
  - b. The reason for the CSE, a description of the work to be performed, and the protective and emergency equipment needed shall be given on the CSC.
  - c. Cleaning/Purging Procedure: Steps listed must assure adequate cleaning. Indicate whether water, steam, nitrogen, air, etc. is the agent to be used, and the quantity and length of time it must be used.

- d. Ventilation Prior to Entry: This section shall discuss initial ventilation used to cool/heat the confined space and remove contaminated air. Air movers may be mounted to blow into or out of the vessel for this purpose, a push/pull system is most effective.
- e. Ventilation for Personnel Entry shall detail the air mover arrangements for personnel safety and comfort. All air movers must be exhausting from the area allowing atmospheric air to be drawn into open manways, particularly the manway used for entry.
- f. Lighting/Electrical Equipment: The electrical equipment used inside any confined space/vessel will be low-voltage equipment, operating from a voltage-reducing transformer outside or 120-Volt AC operating from a GFCI outside.
- g. Emergency Equipment Requirements: All equipment deemed necessary for a safe vessel entry and emergency response must be itemized, beginning with the name of the assigned watch person and an indication of who is providing the watch (such as, pipe fitters, boilermakers, etc.). This to be followed by means of communications, emergency breathing air, wristlets, body harnesses, rope, ladders, portable hoists, etc.
- h. An Emergency Plan is required for each CSE. This plan will describe what the CSE Watch is to do in the event of an emergency requiring rescue operations.

## 2. Entry Procedure

- a. The supervisor and Competent Person responsible for the CSE will review and approve the checklist before allowing the crew to enter.
- b. Gas Test: Testing of the atmosphere within any confined space is mandatory each time entry is contemplated. Potential hazards must first be determined, what instruments are required to test for these hazards and who is to use the instruments. The testing procedure must be documented on the checklist. Probes and long hoses should be used and all readings recorded on the checklist.
- c. Protective Equipment Requirements: Carefully consider the potential hazards the crew could encounter when they come into contact with the atmosphere and chemicals that may be present

in the confined space. Consider work procedures and products and equipment to be utilized by the personnel inside the confined space. The list should include all protective equipment that will be used such as acid suits, body harnesses, air blower gloves, safety backup goggles, respiratory protection and portable hoist device to mention a few.

- d. Upon completion of all aspects of the confined space preparation for entry, the UDOT Safety Risk Manager will review the preparations and JSA. Upon mutual satisfaction with the Contractor Safety Representative that all concerns have been addressed, the Contractor Safety Representative will complete and sign the CSC. Prior to any Confined Space Entry by the Engineer, he/she will assure that checklist and Confined Space Permit has been completed.

## **7.11 Employee Ground Transportation**

### **7.11.1 Policy**

All Contractors and visitors are required to use minimum acceptable transportation designed for passenger use.

### **7.11.2 Purpose**

To establish minimum acceptable guidelines for the safe transportation of all personnel traveling within the project confines. Eliminate personal accidents and injuries resulting from improper equipment use.

### **7.11.3 Responsibility**

Contractors are responsible for assuring that all personnel follow the requirements of this section and prohibit improper transportation of employees and visitors.

Transporting employees in cargo beds of pick ups, vans, etc. is prohibited, unless approved seats and seat belts are provided with approved roll over protection.

### **7.11.4 Implementation**

1. Mobile cranes, forklifts, winch trucks, front-end loaders, tractors and other materials handling equipment are not permitted to transport passengers. Team member employees are prohibited from riding on these vehicles. Operators must be seated and using seat belts.
2. Trucks
  - a. A maximum of three passengers are permitted to ride inside of

the truck cab unless the cab is specifically designed to accommodate additional passengers and includes seat belts for all passengers.

- b. Passengers shall ride with all portions of their bodies inside the truck body or frame.
- c. Passengers shall be in the seated position, with the seat belts in place, before the vehicle is set in motion.
- d. Riding on a vehicle's bumper or tailgate is prohibited.
- e. Tailgates will be closed and latched before the vehicle is operated.
- f. Passengers are not permitted to ride in the body of a dump truck or in the bed of a pickup truck.
- g. Passengers are not permitted to ride on top of the load or to hold materials from shifting.
- h. Vehicles must be designed to accommodate passenger transportation or the vehicle will not be used for that purpose.
- i. Drivers transporting passengers will follow the posted speed limit and project traffic rules.

## **7.12 Housekeeping**

### **7.12.1 Policy**

The basic key to an effective safety and health program is good housekeeping. Safe productivity is enhanced if the project is kept free of trash and debris.

### **7.12.2 Purpose**

The purpose of this section is to incorporate into the day-to-day work activity a good housekeeping action plan that will be followed by all Contractors working on the project.

### **7.12.3 Responsibility**

The Contractors are the most important factor to prevent accidents, through maintaining the work environment free of poor housekeeping conditions. These Contractors, through inspection and example, are responsible for assuring that trash and debris remain out of the work areas. Garbage containers or dumpsters must be



provided and maintained in such quantity and at such locations as to eliminate unauthorized disposal of trash refuse or excess materials which the Contractor does not plan to reuse. If poor housekeeping is observed, the Contractors must follow through and make sure that these conditions are corrected immediately.

The Contractors are responsible for all of their work areas. If poor housekeeping practices are observed corrective action will be discussed with the appropriate Contractor to remind them that cluttered work areas will not be tolerated and that their work area(s) pose a hazard to his employees and other personnel.

The Contractor safety personnel must work with the contractors' staff to assure that their safety recommendations are implemented and the work areas remain clear. The contractors should audit their work areas frequently to assure that all debris are removed to minimize hazards.

#### **7.12.4 Implementation**

The construction site will be inspected by the Contractors and the UDOT Safety Risk Manager. If these inspections reveal deficiencies the Contractor will make the necessary corrections. Follow-up inspections will be conducted. Areas of concern are described below.

1. Buildings and Field Areas: Inspect floors, walls, ceilings, exits, stairs, walkways, ramps, platforms, driveways and aisles for debris and trash.
2. Processing, Receiving, Shipping, Storage: Consider equipment, job planning, layout, heights, floor loads, projecting equipment and materials, containers, waste disposal, leakage and spillage and the cleaning method used to address each of these areas.
3. Lighting: Along with correct housekeeping, the Contractor should consider the employee's ability to see improper housekeeping conditions. Look at the appropriateness, intensity, controls, condition, diffusion, location, glare and the shadows the illumination provides.
4. Chemicals: Housekeeping can pose severe safety and health difficulties for people that may come in contact with them. The Contractor will perform daily inspections of the areas where chemicals are kept, and will consider storage, handling, spillage, leakage, transport, disposal, toxicity, appropriate hazard warning signs, and the correct personal protective equipment and general equipment needed to keep the area clean.
5. Fire Hazard: Fire hazards are most frequently caused by poor housekeeping conditions. Review of areas must key in on the prompt removal of trash from the immediate area and from the site itself.

Improper storage of oily rags, and lack of general clean up of storage yards and around buildings and confined space locations can contribute to fires.

6. Scaffolding and forms may have nails protruding from the wood. Standard practice is to remove or bend nails over when stripping forms or uncrating materials. When Contractor employees remove these materials from the project this practice will provide an added measure of protection.

## **7.13 Signs, Signals and Barricades**

### **7.13.1 Policy**

The Contractor who creates a condition that poses a potential hazard(s) to the general public, other Contractor employees, the Engineer and/or visitors to the project site are required to identify those conditions using signs, signals or barricades, as appropriate.

### **7.13.2 Purpose**

To require the Contractor to identify conditions and operations that pose a hazard to the Engineer employees and/or visitors and to maintain control and warn personnel of these conditions.

### **7.13.3 Responsibility**

1. Prior to the start of operations that may pose a hazard to personnel, such as an overhead lift operation, laser use and non-destructive testing, the Contractor supervisor of the crew conducting operations must place effective warning devices commensurate with the degree of hazards. A JSA will be required. Personnel must be mindful of these warning signs.
2. The Contractor project manager must periodically inspect the work area to assure that warning devices are properly positioned and are effectively warning or restricting all personnel. The UDOT Safety Risk Manager will independently audit areas to assure hazards are correctly identified. If this inspection reveals a safety problem, a safety inspection report will be prepared identifying deficiencies found and give a copy to the Contractor. The Contractor is responsible for immediately correcting the deficiency(s).

#### 7.13.4 Implementation

1. Warning Signs/Tags Specifications

Only approved warning signs shall be used to "tag out" equipment. Caution, Warning and Danger signs must meet the approved size, description and color arrangement.

2. Storage Areas

- a. Flammable and combustible storage areas should be identified as "No Smoking" areas, and appropriate warning signs will be posted.
- b. Project locations used to store either toxic chemicals and/or flammable shall be identified to warn personnel of the pending hazard. Vehicles used to transport these materials within the project site will be identified as required by the Department of Transportation (DOT).

3. Team Member Personal Conduct

- a. All personnel and visitors must obey all messages displayed on the signs, barriers and equipment tags.
- b. All Caution, Warning and Danger signs, used in conjunction with the Lockout/Tag-Out procedure, must be read and the instructions followed. The instruction tags will be installed by the Contractor working on the equipment or system. Signs attached to project equipment or systems are considered to be inviolable. The Engineer will strictly follow instructions written on instruction tags.

4. Signals

- a. The Contractor should use signals to warn people of overhead lifts and similar operations and prevent unauthorized entry into the danger zone. An air horn or a similar effective device may be used to provide this signal.
- b. The Contractor will use flagmen when traffic conditions are adversely affected by construction operations. Flagmen will use warning vests and traffic signal flags. During hours of dusk and darkness illuminated signals will be provided. The Contractor foreman shall review signaling conditions and determine their

effectiveness.

5. Barricades

- a. Barricades will be used but not limited to safeguard project personnel when any of the following conditions exist:
  - When overhead work creates a hazardous condition below
  - When tripping hazards are created
  - When trenches and excavations are cut
  - When toxic substances may drain, spill or leak on any project personnel
  - When driving hazards are created
  - When cleaning vessels, pipes or equipment
  - When spray painting operations are conducted
  - During non-destructive test operations and operations which include laser and other similar equipment use.
- b. Project barricades will be located to maximize personal safeguarding. Each barricade shall warn personnel of the hazard potential, using the appropriate signs discussed in Section A of this procedure.
- c. The Contractor supervisor shall select the type of barricade to be used for personnel protection. This barricade may be as simple as hazard warning tape or more complex as a wood barricade corridor.
- d. When the hazard is eliminated the barricade should be promptly removed by the responsible Contractor.

**7.14 Trenching and Excavation**

**7.14.1 Policy**

All trenching and excavation operations 5 feet and deeper require the installation of a protective system when workers are required to enter the trench/excavation. Site conditions may require additional safeguards or protection in excavations less than 5 feet in depth. All trenching and excavation guidelines can be found in 29 CFR 1926

subpart P.

#### **7.14.2 Purpose**

To establish basic guidelines for overall trenching and excavation operations including the safety practices followed by the Contractor. The plan shall consider at a minimum: underground obstructions, soils classification, depth of cut and type of trench/excavation wall protection to be used, personal protective equipment, potential breathing contaminants, location of excavating equipment, storage of spoil and inspection methods. Protection is required on all exposed sides of an excavation to mitigate fall hazards. Review must include a determination that the protective measures in place are adequate for existing conditions.

#### **7.14.3 Scope**

This procedure will be followed for all trench and excavation operations unless a written exemption is given by a Registered Professional Engineer. The Contractor is responsible for the safety for all trenching and excavation in their work area. The UDOT Safety Risk Manager must evaluate and accept the Contractor safety practices before allowing the Engineer to enter an excavation or trench, the Contractors Competent Person will evaluate the excavation or trench prior to anyone entering the area. If a problem is observed the responsible Contractor will correct the situation immediately and prior to anyone being allowed to enter the area. The Engineer will not enter an excavation or trench until the unsafe conditions are corrected. All unsafe conditions must be reported to the UDOT Safety Risk Manager.

#### **7.14.4 Implementation**

##### **1. Pre-operational Review**

Before the start of any trenching or excavation operation begins the activities described below must be completed by the Contractor and reviewed by anyone who may have to enter the excavation or trench.

- a. A JSA must be completed for each trench and excavation activity 20 feet or greater in depth, hazardous atmospheres exists or are suspected, or where any unique conditions exist. Please refer to Section 9.4, Job Safety Analysis, for specifics of this JSA review.
- b. An OSHA Trenching and Excavation Permit (if required) shall be obtained by the Contractor(s) cutting the trench or excavation. The completion of this document signifies that Contractor supervision and Engineer have reviewed the planned trenching and/or excavation procedure, drawings, and provided the protective measures.

- c. If piping, electrical conduit or other under ground obstructions are not specifically located, either instruments or probes shall be used to locate that equipment, prior to the start of operations. The Contractor's Foreman shall have a good knowledge of what obstructions might be found, prior to cutting into the soil. Without this knowledge a potential hazard exists.

## 2. Operational Safety

At a minimum, all trench and excavation operations shall be guided by the following safety considerations:

- a. When obstructions are located by the Contractor using a probe or instrument, all excavating within five feet of an operating line, buried conduit or cable will be "hand dug."
- b. Trench/excavation walls 5 feet and greater in depth, or less if conditions require, shall be shored, sloped or a protective device (such as a trench shield) will be used to protect employees. The JSA and Trench Excavation Permit protective measures shall be followed respective of the type and extent of needed employee protection.
- c. If an unexpected condition poses a hazard to employees, such as excessive ground water or lack of soil stability, the work will be discontinued and protective measures re-evaluated. If modifications to the JSA and permit are required, these changes will be completed and the added employee protective measures taken prior to the resumption of soil removal. Personnel will not re-enter the trench/excavation until these additional corrective measures are implemented.
- d. Excavated material shall be effectively stored or retained at least 4 feet or more from the edge of any excavation that employees may be required to enter. Boulders and other loose debris will be removed from the work area.
- e. The Construction Foreman and/or Competent Person in charge of the work crew shall conduct daily inspections of the trench or excavation area, prior to personnel entry.
- f. If evidence of possible cave-ins or slides is apparent, all work in the excavation area will cease until necessary repairs or

precautions have been taken to safeguard employees. The UDOT Safety Risk Manager will be advised of any unusual trench/excavation occurrence.

- g. When employees are required to be in trenches four feet deep or more, an adequate means of exit, such as a ladder or steps, will be provided and located so that no more than 25 feet of lateral travel is required to reach an exit.
- h. Barricades will be erected by the Contractor doing the digging. Flashing caution lights will be installed at night. The Contractor completing the work will remove the barricades. Fences or other appropriate physical barriers are required when an excavation is to be left open for longer than 24 hours. Barricades will be maintained on a daily basis.

### 3. General Considerations

- a. Maximum Allowable Slopes (see Table 7-1)
  - The sides of the cut shall be sloped at the natural angle or degree which the sloped surface would develop in weathering.
  - Normally, a slope angle would be not less than 1.5:1 feet on the horizontal to each foot on the vertical.
  - When it is not possible to slope to the angle of the slope, shoring or a protective device must be used to prevent a cave-in. No one will enter a trench without a correct angle of slope, shoring or protective device.
- b. Measurement of Slope Angle
  - The Slope Angle should be measured as accurately as possible. Measurement should be made with an inclinometer or a combination square in connection with a spirit level and aligned with a board at the edge of the slope. There are several ways to measure angle of the slope, but "eyeballing" is not a valid measurement technique.
  - A common way of measuring angle of the slope involved the use of a pole with a weighted string which is lowered into the center of the trench.

- c. Personnel are reminded that cave-ins may be caused by:
- Hydrostatic pressures from freezing or thawing
  - Vibration from vehicles or equipment operating inside the trench, or nearby
  - Improper sloping of trench walls
  - Failure to place removed soil, equipment or material at a safe distance from the edge of the trench
  - Failure to shore properly and to brace trench walls.

Cave-ins sometimes occur when shoring is being installed or removed. A common, contributing factor to a cave-in is the tendency to omit shoring when the trench is to be left open for only a short time.

d. Lack of Space

To some extent, all employees engaged in trenching operations are exposed to the hazards of cave-ins. Trenches are usually narrow and the lack of space complicates the danger of a cave-in.

e. Warning Signals

Experienced workers may be able to detect an approaching danger of a cave-in from tension cracks, moisture, and changes in soil texture. Less experienced employees are less likely to recognize these indications.

f. Associated Hazards

- Employees are exposed to additional hazards which involve more than soil movement. Underground utility lines often present dangerous surprises and account for a large number of fatalities in excavations. Buried electrical cable also poses an additional electrical hazard potential.
- Utility lines for water, steam, and gas present hazardous conditions which may require the employees to use protective equipment and to obtain as much advanced information about the location as possible.



- Carbon monoxide can reach hazardous concentrations in trenches and excavations. Accordingly, provisions shall be made for detection and suppression of heavier than air gases, like methane gas.
- The failure to use personal protective equipment has resulted in many injuries which could have been prevented.
- Local Utility Marking Centers and all other owners of underground facilities not members of a Notification Center shall be advised of the proposed work at least 2 work days prior to start of excavation.

**TABLE 7-1**  
**MAXIMUM ALLOWABLE SLOPES**

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V) FOR EXCAVATIONS LESS THAN 20 FEET DEEP [3]
STABLE ROCK	VERTICAL (90°)
TYPE A [2]	3/4:1 (53°)
TYPE B	1:1 (45°)
TYPE C	1½:1 (34°)

**NOTES:**

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
2. A short-term a maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feet or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet in depth shall be 3/4H:1V (53 degrees).
3. Sloping or benching for excavations greater than 20 feet deep shall be designed by a Registered Professional Civil/ Structural Engineer.
4. Soil Description Includes:

Type A soil: Cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caleche and hardpan are also considered Type A.

However, no soil is Type A if:

- (1) The soil is fissured; or
- (2) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
- (3) The soil has been previously disturbed; or
- (4) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or
- (5) The material is subject to other factors that would require it to be classified as a less stable material.

Type B soil:

- (1) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf; or
- (2) Granular cohesion less soils including; angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
- (3) Previously disturbed soils except those which would otherwise be classed as Type C soil.
- (4) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
- (5) Dry rock that is not stable; or
- (6) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C soil:

- (1) Cohesive soil with an unconfined compressive strength of 0.5 tsf or less; or
- (2) Granular soils including gravel, sand, and loamy sand; or

- (3) Submerged soil or soil from which water is freely seeping; or
- (4) Submerged rock that is not stable, or
- (5) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

## **7.15 Project Electrical Requirements**

### **7.15.1 General**

The Contractor is responsible for implementation of an aggressive electrical safety program at the Project. This safety program element will include safe installation, work practices, maintenance, and special equipment considerations. All electrical installations, either temporary or permanent, shall be in conformance with the National Electrical Safety Code, NFPA-70, ANSI-C1, and low and high voltage electrical safety orders OSHA code requirements. Only qualified employees will install electrical tools and equipment, defective and/or improperly installed equipment may pose a hazard to personnel simply by being in the work area. If an unsafe condition is observed the responsible Contractor must correct the hazard immediately.

### **7.15.2 Hazardous Locations**

Where the Contractor/Subcontractor plans to cut a trench or excavation in an area that may contain underground electrical lines, procedures will be undertaken to positively locate the lines prior to the continuation of work. Those circuits which cannot be adequately guarded will be de-energized and grounded before digging is allowed to continue. Only hand digging should be permitted within 5 feet of buried electrical cable.

Congested areas containing electrical equipment, switches, or live circuits will not be used as passage ways. The Contractor will install a positive physical barrier to prevent employees from accidentally entering such areas.

### **7.15.3 Disconnect and Over current Protection**

All electrical disconnect and Over current protective devices will be identified as to their purpose. Disconnect and Over current devices will be located in a position that will not expose the devices to physical damage. The temporary disconnect power panels must have solid faces to ensure that all current-carrying parts are not exposed to accidental contact. The Contractor(s) shall inspect their temporary power panels at least weekly to ensure that circuits are properly identified, grounded, and safety equipment like ground fault-circuit interrupters (GFCI) are operating correctly.

#### 7.15.4 Ground-Fault Circuit Interrupters (GFCI)

##### 1. Definitions

- a. *Ground*: A conducting connection, whether intentional or accidental, between an electric circuit or equipment and the earth (or to some conducting body which serves in place of the earth).
- b. *Ground-Fault Circuit Interrupter*: A device for the protection of personnel that de-energizes a circuit or portion thereof within an established period of time when current-to-ground exceeds some predetermined value less than that required to operate the Over current protective device of the supply circuit.

##### 2. Implementation

The Contractor is required to follow the GFCI safety procedures for the use of temporary electrical power in addition to an Assured Conductor Grounding program.

- a. All equipment (electric saws, drills, extension cords, etc.) capable of being plugged into a 110-volt receptacle shall have a GFCI device provided prior to the tool and/or extension cord/tool.
- b. **Testing and Record Keeping**: All GFCIs should be tested by a competent Contractor representative. The test will be done by introducing a ground fault into the circuit using a commercially available GFCI tester. Test buttons for the circuit may trip the device but may not provide the protection intended if the breaker is faulty or incorrectly wired. A record of testing should be kept, identifying the following: serial number of unit, date of purchase, brand, model number, date of initial testing done before placing into service by using GFCI tester, and date of inspection. Power tools and cords should be inspected and marked on a routine basis, as determined by the Contractor's Assured Grounding Program.

##### c. Nuisance Tripping of GFCI Devices

The following conditions usually will cause tripping of GFCIs:

- Water leaking into cord connection: This can usually be remedied by using a twist-lock cord and cap. Raising connections out of wet locations will also correct this problem.

- Faulty or defective equipment plugged into a GFCI circuit: By plugging the tool into an entirely different spider or receptacle, it can be determined if that tool is defective. The tool must be tagged "out of service" and repairs made if it is found to be defective.

#### **7.15.5 Equipment and Maintenance**

1. No Contractor employee shall perform work on live (energized) electrical components or conductors. Circuits should be de-energized, locked and tagged, and tested to confirm de-energizing. Work on energized or Ahot@ systems will require the submission and approval of a JSA.
2. Where it is not possible to de-energize electrical components or conductors, the Contractor employee shall be protected by approved guarding and/or insulation. JSA is required.
3. Portable power tools shall either be grounded or of a double insulated type.
4. Extension cords shall be 12 AWG or better, grounded, and maintained in good condition. Repair to a break in the cord insulation is not be allowed.

#### **7.15.6 Installation**

Equipment grounding conductors shall be installed as described below.

1. All 120-volt, single-phase, 15- and 20-ampere receptacles shall be of the grounding type, and their contacts shall be grounded by connection to the equipment grounding conductor of the circuit supplying the receptacles in accordance with the applicable requirements of the National Electrical Code (NEC).
2. All 120-volt cord sets (extension cords) shall have an equipment grounding conductor which shall be connected to the grounding contacts of the connector(s) on each end of the cord.
3. The exposed non-current-carrying metal parts of 120-volt cord-and plug-connected tools and equipment that are likely to become energized shall be grounded in accordance with the applicable requirements of the NEC.

### **7.15.7 Visual Inspection**

1. The Contractor will instruct their employees to visually inspect receptacles, flexible cord sets (extension cords), except those that are fixed and not exposed to damage, and equipment connected by cord and plug before each day's use for external defects such as deformed or missing pins or insulation damage and for indication of possible internal damage. Where there is evidence of damage, the damaged item shall be taken out of service and tagged until tested and any required repairs made.
2. All 120-volt, single-phase, 15- and 20-ampere receptacles which are not a part of the permanent wiring of the building or structure, 120-volt flexible cord sets, and 120-volt cord and plug-connected equipment required to be grounded shall be tested for continuity and shall be electrically continuous.

### **7.15.8 Hand Tools and Small Equipment**

All electrical repair of hand tools will be performed by qualified individuals after the tool or motor or piece of equipment is disconnected from the source of power. Small tools and equipment that cannot be disconnected will not be repaired until locked and tagged out of service in accordance with Section 3.2 of this plan. All maintenance and repair of electric hand tools and small equipment shall return the equipment to a condition which meets or exceeds the manufacturer's original specification.

### **7.15.9 Grounding and Bonding**

#### **7.15.10 Fixed Equipment**

Exposed non-current-carrying metal parts of fixed electrical equipment, including motors, generators, frames and tracks of electricity-operated cranes, electrically driven machinery, etc., must be grounded. Bonding shall be provided where necessary to assure electrical continuity and the capacity to conduct safely any fault current. Electrical continuity of metal noncurrents carrying parts of equipment in any hazardous locations as defined in the Electrical Safety Orders is required.

#### **7.15.11 Effective Grounding**

The path from circuits, equipment, structures, and conduit or enclosures to ground shall be permanent and continuous, have ample carrying capacity to safely conduct the currents liable to be imposed on it, and have impedance sufficiently low to limit the potential above ground and to result in the operation of the overcurrent devices

in the circuit.

#### **7.15.12 Ground Resistance**

1. Pipes, rods of iron or steel, or nonferrous conductors can be used for electrodes. They must conform in diameter to the requirements of the NEC. They should have a clean metal surface and should be driven to a depth of at least 8 feet regardless of the size or number of electrodes used. Where rock bottom is encountered at less than 4 feet, the electrode should be buried in a horizontal trench, at least 2 2 feet deep.
2. Single rod electrodes, where practical, shall have a resistance to ground not to exceed 25 ohms. Where the resistance is not as low as 25 ohms, two or more electrodes connected in parallel should be used.

#### **7.15.13 Testing of Grounds**

1. Grounding circuits must be checked with a ground meter to ensure that the circuit between the grounded power conductor has a resistance which is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.
2. Driven ground rods should be given a special test because of variance in resistance resulting from different soil conditions. They should be checked for corrosion, damage and separation of the ground wire from the clamp.

#### **7.15.14 Wet Locations**

In wet or damp areas, where it is determined that the danger of electric shock is increased by the conditions, the following requirements will be enforced:

1. Electrical circuits for lighting and tools should be protected by GFCI and not exceed 110-120 volts.
2. Fixed tools and equipment will use both GFCI and a positive ground.

The Contractor JSA will address special precautions for all work in wet or damp areas.

### **7.16 Lock-Out/Tag-Out (LOTO) Procedures (JSA Required)**

#### **7.16.1 Policy**

Equipment should be properly and uniformly locked out and tagged whenever it is

down for any reason, in order to protect the exposed employees from inadvertent equipment operation and potential harm.

#### **7.16.2 Purpose**

The purpose of this section is to provide a safe method for rendering inactive any electrical equipment or operating systems (including mechanical or piping) when equipment is down for any reason, such as repair, removal or replacement. This procedure is provided in an effort to identify certain LOTO procedural elements. The Contractor's program must meet or exceed this procedure, and contain the basic elements to protect all employees from the potential hazards. Compliance with the established procedures at operating facilities may be required.

#### **7.16.3 Responsibilities**

When needed, the Contractor is responsible to assure that a LOTO procedure is put in place in their area of work. The Contractor Project Manager is responsible to ensure that all construction employees are trained and familiar with and use the procedure wherever it applies. Engineer Team Members are responsible to be aware that a LOTO Program is in effect and the specifics of the Contractor's program. Anyone who may be exposed to the sudden release of energy or materials will be familiar with and abide by the established LOTO procedure. If an ENGINEER Team Member observes a safety problem, he/she will notify the Contractor responsible for the area and the UDOT Safety Risk Manager.

#### **7.16.4 Implementation**

1. A LOTO procedure should include three basic phases of work on any system: (1) shutting down equipment, (2) repairing or installing equipment, and (3) startup of equipment. It is likely that some situations will not include all three phases as such; however, regardless of the operation and the phase or phases involved, the "lockout/tag-out" clearance procedure must be observed to assure the safety of the operation.
2. Even though this procedure generally provides for locking and tagging of equipment, the danger tag alone is to be considered an inviolable device and any equipment bearing such a tag must not be operated under any circumstances. Also, locks must be used in conjunction with a tag to afford maximum personnel protection.
3. Prior to starting any major operation, which would involve these locking and tagging procedures, a meeting shall be set up by the supervision, employees and inspectors involved. The project's safety personnel shall attend this meeting. A specific procedure will be adopted and reviewed by all concerned with the operation, prior to commencement



of work.

#### **7.16.5 Shutdown and Repair of Equipment or Systems**

1. All personnel, before working on equipment should assure that:
  - a. Others are not already working on the piece or system, and if others are working on it, that this procedure will not endanger any personnel or the equipment.
  - b. Equipment is not under pressure, energized, at elevated temperature or otherwise unsafe to be worked upon.
2. Others adjacent to the work area are not endangered.
3. Before starting work, the supervisor shall contact the designated supervisor (responsible for the equipment or system). This supervisor will show him the devices that require tagging; i.e., switches, starters, valves, lockout controls, etc. This will be accomplished by using an approved danger tag.
4. The main disconnect shall be opened in addition to any remote control switches. On electrical work, it is advisable as a further precaution for the electrician to remove the supply fuses. On piped systems, the main valves shall be closed and pressure relieved. The supervisor shall make sure that the equipment or system is inoperative.
5. After assuring himself that the equipment has been properly shut down in accordance with the procedures described above, the supervisor and employees involved in the work shall positively determine that the equipment or system has been locked and tagged. A distinctive danger tag and lock (when possible) will be attached to each device. This tag shall be dated and signed by the individuals doing the work. A short explanation of the reason for the tag should appear in the provided spaces. Only authorized personnel will repair specific equipment with system danger tags.
6. If mechanically possible, a padlock (to which only the employee placing the lock shall have access to keys) shall be placed on equipment in such a manner as to render operation of the equipment impossible.

#### **7.16.6 Starting Up Equipment or Systems**

1. As soon as the work is completed, the danger tags and locks shall be removed only by the individuals installing them.

2. In the event the shift ends before the work is completed, the status of the work is to be reported in detail to the oncoming shift personnel and the tags and locks on the system replaced by the oncoming shift personnel.
3. Upon completion of the work, the Contractor supervisor will make certain all tags and locks have been removed and personnel are clear of the equipment or system. The equipment will be returned to normal operating conditions.

#### **7.16.7 General**

1. In an emergency, or if the person who placed the tag and lock is not available, the Lock and Tag Removal Procedure established in the Contractors LOTO procedure will be implemented.
2. Personnel deviating from these instructions, or unauthorized persons removing danger tags, may be subject to disciplinary action to include their removal from the project.

#### **7.16.8 Safety Engineering Standard for Lockout/Tag-Out Procedure for Electrical or Electrically Powered Equipment**

##### **1. Procedure**

Whenever it becomes necessary to perform service, maintenance or alterations to electrically powered equipment, the following procedure is to be followed:

- a. The Contractor supervisor (and employees working on the system) having care and custody of the equipment will secure tag and locks to all stations from which the equipment can be started and initiated. An electrical lockout/ tagout record shall be completed prior to calling an electrician to lock and tag the power source.
- b. The electrician will obtain the electrical lockout tag from their Contractor supervisor and will isolate the appropriate power source and affix a lock and a lockout tag in such a manner as to prevent the power source from becoming energized. The electrician will then sign the lockout tag and identify reason for equipment being locked out. The construction craft supervisor will log the lockout tag number into his Electrical Lockout Status log book or equivalent log.

- c. The responsible electrician and the construction craft supervisor will verify that the designated equipment has been isolated by attempting a start from one of the start stations. The "try" attempt must be made on all locked and tagged equipment.
- d. When the crew arrives at the project job-site, the lockout tag will be assigned and will be prominently displayed at the job-site. The Contractor supervisor will verify that the lockout is in place by witnessing a representative attempting to start the equipment from the field start switch or visually checking the lockout in the substation of the motor control center each time a safe work permit is issued to service the locked out equipment.
- e. A set procedure must be established to energize the equipment. This procedure must include the responsible Contractor supervisor and the craft electrician. Procedure established must ensure that equipment is not inadvertently energized and be fool-proof.

2. Work Continuing Beyond Shift Change

- a. If work is to be continued beyond the "normal" shift, the lockout tag and the Safe Work Permit will be returned to the responsible Contractor supervisor indicating the status of the job.
- b. Contractor supervisor shall transfer both the tag and the permit to the supervisor of the oncoming shift after relating all precautions needed to perform the work safely.
- c. If the work is not carried on continuously by an oncoming shift, the Contractor supervisor's lockout tag log book must indicate the status of any extended lockout condition.

3. Testing

The above procedure will apply to the electrical testing of circuits with the following addition. Electricians testing circuits or "bumping" motors may energize the circuit for short periods of time while testing without voiding the lockout procedure provided:

- a. Craft electrician has all Contractor supervisors' permission to test.
- b. He has all lockout tags in his possession.

- c. Testing may be done only when no other work is being performed by any other crew on the equipment being tested.

It is extremely important that all remote start switches be tagged by the operations supervisor's to prevent inadvertent operation of the equipment during these periods.

4. Work Done By Multiple Crews

If more than one crew is assigned to work on the equipment initially or at any subsequent time during the duration of the job, each crew will independently obtain a lockout tag and lock device to assure circuits/equipment cannot be energized by any one crew acting independently.

## **7.17 Nondestructive Testing**

### **7.17.1 Policy**

Prior to the start of operation, the Contractor conducting nondestructive test operations should submit its safety and health plan for review. The plan must detail required documentation to ensure that Contractor employees are not exposed to potentially harmful levels of radiation.

### **7.17.2 Purpose**

The purpose of this procedure is to establish and maintain effective controls over all nondestructive testing operations, and require that all Engineer Team Members or Contractor employees are not exposed to harmful levels of radiation.

### **7.17.3 Definitions (Ionizing Radiation)**

1. Radiation: Includes alpha rays, beta rays, gamma rays, X-rays, neutrons, high-speed electrons, high-speed protons, and other atomic particles, but such terms do not include sound, radio waves, visible light, infrared or ultra-violet light.
2. Radioactive material: Any material which emits, by spontaneous nuclear disintegration, corpuscular or electromagnetic emanations.
3. Restricted area: Any project area the access to which is controlled by the contractor for purposes of protecting individuals from exposure to radiation or radioactive materials.

4. Unrestricted area: Any area the access to which is not controlled by the contractor for purposes of protecting individuals from exposure to radiation or radioactive materials.
5. Dose: The quantity of ionizing radiation absorbed, per unit of mass, by the body or by any portion of the body. When the provisions in this section specify a dose during a period of time, the dose is the total quantity radiation absorbed, per unit of mass, by the body or by any portion of the body during such period of time. Several different units of dose are in current use.
6. Rad: A measure of the dose of any ionizing radiation to body tissues in terms of the energy absorbed per unit of mass of the tissue. One rad is the dose corresponding to the absorption of 100 ergs per gram of tissue (1 millirad (mrad) = 0.001 rad).
7. Rem: A measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of 1 roentgen (r) of X-rays (1 millirem (mrem) = 0.001 rem). The relation of the rem to other dose units depends upon the biological effect under consideration and upon the conditions for irradiation. Each of the following is considered to be equivalent to a dose of 1 rem:
  - a. A dose of roentgen due to X- or gamma radiation.
  - b. A dose of 1 rad due to X-, gamma, or beta radiation.
  - c. A dose of 0.1 rad due to neutrons or high-energy protons.
  - d. A dose of 0.05 rad due to particles heavier than protons and with sufficient energy to reach the lens of the eye.
  - e. If it is more convenient to measure the neutron flux, or equivalent, than to determine the neutron dose in rads, 1 rem of neutron radiation may, for purposes of the provisions in this section, be assumed to be equivalent to 14 million neutrons per square centimeter incident upon the body; or, if there is sufficient information to estimate with reasonable accuracy the approximate distribution in energy of the neutrons, the incident number of neutrons per square centimeter equivalent to 1 rem may be estimated from the neutron flux dose equivalents.
8. Air dose: For determining exposures to X- or gamma rays up to 3 million electron volts (MeV), the dose limits specified in this section

may be assumed to be equivalent to the "air dose." For the purpose of this section "air dose" means that the dose is measured by a properly calibrated appropriate instrument in the air at or near the body surface in the region of the highest dosage rate.

9. Testing agency: The contracted designee responsible for testing operations.

#### **7.17.4 Responsibility**

1. Contractors and/or their testing agency shall be required to establish safe operating procedures and record keeping methods commensurate with the test operation.
2. Contractors and/or their testing agency shall abide by OSHA safety requirements and submit the operating safety and health plan prior to the start of operations.

#### **7.17.5 Implementation**

1. General
  - a. The Contractor and/or testing agency shall provide a safety program which addresses the type of nondestructive testing used:
    - Magnetic particle
    - Penetrant
    - Ultrasonic
    - Triboelectric
    - Electromagnetic
    - Radiographic
  - b. The testing agency program(s) shall be submitted to the Engineer prior to the start of test operations.

2. Licenses/Certifications

The testing agency shall maintain all licenses and/or certifications required for nondestructive test operation(s). These documents shall be available for review commensurate with federal/state requirements.

3. Testing Agency Safety Programs

Each Contractor should contractually task their testing agency to provide a safety program and designate an individual responsible for implementing that program. This program must at least include the

detail included in this procedure. Independent testing agency program(s) should include as an appendix to the JSA.

4. Radiation

- a. Prior to the initial use or operation of a radiation-producing machine or the storing, using or handling of any radioactive material, the Engineer representative shall be notified of such action, including a statement on the proposed location, nature and scope of such operation, use, or storage.
- b. All radiation machines and radioactive materials shall be used, stored, handled, transported, or disposed of in such a manner that no person receives an unnecessary dose of radiation.
- c. In the use or application of radioactive material, permissible doses, levels of radiation, concentrations, precautionary procedures, and disposal shall be within the limits and controls in applicable federal/state safety requirements.
- d. Operations involving radiation hazards shall be performed under the direction of a qualified person designated as responsible for radiation safety, and shall conduct such surveys and evaluations, and secure specialized assistance required to ensure compliance with radiation protection standards. In case of materials used under Nuclear Regulatory Commission (NRC) license, only persons actually licensed or Competent Persons under direction and supervision of the licensee shall perform such work.
- e. The dose for an individual shall include all doses, from both internal and external sources from all types and energies of radiation, whether delivered simultaneously or successively, to the region of interest during the period of measurement.
- f. Dosimetry shall be maintained on all persons exposed to radiation where the dosage can exceed one-fourth the permissible limits established, and on each individual who enters a high-radiation area. Instruments and dosimetry devices shall detect and provide for measurement, within an acceptable error, of the accumulated dosage of all types of radiation to which personnel are exposed.
- g. Records shall be maintained by the testing agency of the exposure of personnel to radiation in such a manner that accumulated exposure can be determined at a future date.
- h. Personnel shall not be exposed to a dose in excess of that pre-

scribed for the general public. Personnel under 18 years of age and pregnant women shall not be permitted in an area where there is a possibility of body intake of radioactive material from such sources as contamination or radio-chemical procedures.

- i. Periodic and terminal examinations will be given when over exposures are detected by the dosimetry program or in accordance with the testing agency's program.
- j. All cases of overexposure shall be referred to a physician and reported to the Engineer.
- k. Any loss, theft, damage, or overexposure shall be reported to the designated authority and the NRC under the requirements of 10 CFR Part 20 and the UDOT Safety Risk Manager.
- l. Interstate or intrastate transportation shall comply with the requirements of the Department of Transportation for transportation of explosives and other dangerous articles.

5. Non-ionizing Radiation

- a. Only qualified and trained employees shall be assigned to install, adjust, and operate laser equipment.
- b. Personnel, when working in areas in which a potential exposure to direct or reflected laser light greater than 0.005 watts (5 milliwatts) exists, shall be provided with laser safety goggles which will protect them for the specific wavelength of the laser and be of optical density (O.D.) adequate for the energy involved. The laser safety goggles will be selected in accordance with the requirements of ANSI Z136.1.
- c. All protective goggles shall bear a label identifying the following data:
  - The laser wavelength for which use is intended
  - The optical density of those wavelengths
  - The visible light transmission.
- d. Areas in which lasers are used shall be posted with standard laser warning placards.
- e. Beam shutters or caps shall be utilized, or the laser turned off, when laser transmission is not actually required. When the laser is left unattended for a period of time, such as during lunch hour,



overnight, or at change of shifts, the laser shall be turned off.

- f. Only mechanical or electronic means shall be used as a detector for guiding the internal alignment of the laser.
- g. The laser beam shall not be directed at personnel. Revolving laser units shall be set above or below the heads of personnel.
- h. When it is raining or snowing, or when there is dust or fog in the air, the operation of laser systems shall be prohibited where practicable; in any event, employees shall be kept out of range of the area of source and target during such weather.
- i. Laser equipment shall bear a label to indicate maximum output, make, and beam spread.
- j. Personnel exposure shall be controlled to stay within the levels specified in ANSI Z136.1.
- k. Looking into the primary beam must be avoided and care shall be exerted to avoid looking at specular reflections at the beam including those from lens surface work.
- l. Aligning the laser with the naked eye is prohibited.
- m. Personnel shall not be exposed to microwave power densities in excess of 10 milliwatts per square centimeter and radio frequency generating equipment.

## **7.18 Concrete Operations**

### **7.18.1 General**

This section establishes the safety requirements for concrete construction and masonry work, including specialty operations. Specialty operations include pre-stressing, post-tensioning, tilt-up slabs, vertical and elevated slabs, slip forms, and the batch plant operations.

The Contractor will be responsible for all concrete operations safety in the area of their work.

The following paragraphs describe the items the Contractor is responsible for.

### **7.18.2 Concrete Mixing**

1. The concrete mixing machinery and equipment, including conveyors,

chutes, hoppers, gear and chain drives, and all moving equipment will be guarded to prevent entry into the danger zone. Machinery guarding should be checked daily for compliance.

2. All batch mixing areas should be well lighted. Noise level monitoring of these areas is required to determine levels of hearing protection necessary to protect personnel, signs must be posted.
3. The ad-mix storage area will be well ventilated and all containers sealed to prevent excessive dust. All compressed air and pressurized hoses will be joined with positive fail safe joint connectors. Personnel working in the ad-mix area will be required to wear appropriate dust masks, hearing and eye protection in addition to the required standard personal protective equipment.
4. Batch plant workers shall be thoroughly oriented to the chemicals and materials in use. Potential hazards and special handling, as well as any unique fire or explosion hazards, will be on file on a Material Safety Data Sheet (MSDS) (see Section 6.3). Personal protection equipment must be provided as required in MSDS instructions
5. All maintenance and mechanical inspection operations will be performed under a positive "lockout tag-out" program per Section 9.15 of this plan.

### **7.18.3 Bulk Transportation**

The transport of bulk materials and mixed concrete in and out of the Project and/or batch plant area presents what may be the most hazardous part of the operation. All bulk material transports and concrete trucks should require an employee to act as a traffic controller or spotter while operating in the batch plant perimeter or restricted location(s). One-way traffic patterns, with proper road signs and stop signs may be established to avoid backing, U-turns, and reversing direction. Pressurized loading or unloading systems will be inspected at each use and all hose connections should have a fail safe closing mechanism. It is recommended that during large concrete pours, an additional worker be assigned as a traffic coordinator/spotter.

### **7.18.4 Concrete Cylinders**

Concrete cylinder storage areas will be maintained separate from batch plant operations. Concrete cylinders will be stored on pallets stacked no higher than 5 feet. Concrete testing equipment, including press equipment used to break cylinders, will be properly guarded.

#### **7.18.5 Reinforcing Steel** (refer to Section 7.8 Fall Protection)

The following are minimum requirements for the safe handling, installation and use of reinforcing steel:

1. All personnel working with reinforcing steel must wear required personal protective equipment at all times when they are within the work area.
2. Contractor employees will use Fall Arrest System prior to placing and tying reinforcing steel in walls, piers, columns, etc. (refer to Section 7.8 Fall Protection).
3. Contractor employees will not work above vertically protruding materials or reinforcing steel unless it has been protected to eliminate impalement. This can be accomplished by bending the steel over or covering the protruding ends of the steel with approved/ manufactured/ engineered covers.
4. Reinforcing mats may not be used as a walkway for general access unless provided with 2-inch by 12-inch planking to afford safe footing for personnel after rebar mat is complete and access is necessary.
5. Good housekeeping will be maintained at all times to reduce tripping and falling hazards.
6. Bundles of reinforcing steel moved by any type of crane must be securely tied together to prevent slipping. Steel bundles over 20 feet in length are to be handled by properly spaced two-part slings.
7. Reinforcing steel for walls, piers, columns, and similar vertical structures must be guyed and supported to prevent collapse.
8. Wire mesh rolls must be secured to prevent uncoiling.
9. Reinforcing steel must not be used for scaffolding hooks or stirrups, nor shall it be used as a load-bearing member of any lifting device.
10. Guiding of reinforcing mats and columns when required.

#### **7.18.6 Concrete Placement**

1. Mixers

- a. All gears, chains and rollers of mixers must be properly guarded to eliminate pinch points. When concrete mixers are equipped with one yard or larger loading skips, they will be equipped with a mechanical device to clear the skip of material. Protective guardrail installed on each side of the skip of these mixers will prevent anyone from walking under the skip while it is being lowered.
- b. Transit trucks shall be equipped with a loud warning device (back up alarm), which is automatically activated immediately when the truck is backing.
- c. A spotter shall be assigned to warn personnel working on the sub-grade when a truck is backing into the area and to signal the truck driver when all workers are clear. The spotter should be on the driver's side and to the rear of the vehicle.
- d. Waste material shall not be allowed to accumulate around mixers and pumps.
- e. Switches must be locked in open positions, tagged, fuses removed, throttles closed, and operating power of mixers locked in the off position when cleaning inside the drum.
- f. When trucks are discharging on a slope, the wheels must be blocked and the brakes set to prevent movement. If trucks are unloading into concrete buggies, these should be routed to provide a smooth flow of traffic.

## 2. Runways

Runways shall be strongly built, evenly supported, and have a smooth-running surface of sufficient width to prevent buggies running off. Runways shall be of a flat enough slope so that workers will not slip, or cleats shall be fastened to sloping runways when the incline exceeds one-foot rise in a five-foot run. All runways must be kept free of ice, snow, grease, mud and other slipping hazards.

## 3. Concrete Buggies

Buggies are to be kept clean and material must not be allowed to collect on the inside. Stop cleats must be used at all places where buggies are dumping materials. Handles of buggies shall not extend beyond the wheels on either side of the buggy. The use of knuckle guards on buggy handles is recommended.

#### 4. Crane Buckets

- a. Concrete buckets positioned by cranes are to be suspended from deep-throated hooks, equipped with a swivel and safety latch. A signalman shall be posted in clear view of the receiving area and the crane operator. Where this is not possible, a reliable communication system shall be used.
- b. Concrete buckets equipped with hydraulic or pneumatically operated gates shall have positive safety latches or similar safety devices installed to prevent premature or accidental dumping. Buckets shall be designed to prevent aggregate and loose material from accumulating on the tops and sides of the bucket.
- c. Riding on concrete buckets for any purpose is prohibited, and concrete workers must be kept out from under suspended buckets. All buckets will be equipped with safety-tag lines to control direction.

#### 5. Conveyors

Conveyors will be designed, installed, operated and maintained in accordance with the provisions of the ANSI code for conveyors, cableways and related equipment, and applicable parts of OSHA Regulations.

#### 6. Pump Systems

- a. Pump systems using discharge pipes should be provided with pipe supports designed for 100-percent overload. Where personnel are required to work from the pipe supports, the supports and scaffolding shall have a minimum safety factor of 4. Compressed air hose in such systems shall be provided with positive fail-safe joint connectors to prevent separation of sections when pressurized. Two safety tag lines will be used to control the end of the pump chute and trunk.
- b. Concrete pumping units shall have their wheels off the ground when equipped with hydraulic outriggers.

#### 7. Walkways and Scaffolding

Walkways and scaffolding, equipped with guardrail, shall be provided along the access and point of placement in walls, piers, columns, etc.,

located over 6 feet above the floor or ground level.

8. Concrete Tools

- a. Powered and rotating type concrete troweling machines that are plainly guided shall be equipped with a control switch that will automatically shut off the power whenever the operator removes his hands from the equipment handles.
- b. Conductors, frequency changes, and other energized parts on concrete vibrators shall be installed and grounded in accordance with applicable provisions of the National Electrical Code.
- c. Handles on bull floats, used where they may contact energized electrical conductors, shall be constructed of nonconductive material, or insulated with a nonconductive sheath with electrical and mechanical characteristics providing the equivalent protection of a handle constructed of nonconductive material.

9. Shotcreting

In applying shotcrete containing chemicals and hazardous accelerators or hardening mixtures, the nozzleman and helpers shall wear gloves and sandblasting hoods supplied with filtered air free of toxic or objectionable material or other personal protective equipment as required by the manufacturer. Mixing machines require guarding the moving parts, including those within the material hopper. Personal protection equipment shall be provided as required in Portland Cement MSDS and also for any toxic additions to mix.

10. Patching, Finishing and Curing

- a. Scaffolding, boatswains chairs, harness and lines shall be provided for finishing and curing crews working on walls, piers, columns, and other vertical or hazardous sloping surfaces. An independent tie off (free of the structure) will be provided for fall protection securement devices.
- b. Finishers will be required to wear safety glasses and face shields when chipping, wire brushing or using power impact or rotary tools in patching concrete.

**7.18.7 Concrete Forms** (refer to Section 7.8 Fall Protection)

- 1. All structural members and their connections will be carefully planned so that a sound determination for the loads may be accurately made

and allowable stresses calculated.

2. Formwork must be adequately designed, erected, supported, braced and maintained so that it will safely support all vertical and lateral loads that may be applied until such loads can be supported by the concrete structure.
3. Good housekeeping must be maintained at all times, and stripped lumber and materials intended for reuse must be cleaned of nails and wire and removed from the immediate work area.
4. Adequate fire protection must be provided in areas where wood forms and other combustible materials are being used in connection with welding, cutting, burning or other sources of ignition.
5. Form supports and wedges must be checked during concrete placement to prevent distortion or failure.
6. Imposition of any construction loads on the partially completed structure shall not be permitted unless such loading has been considered in the design and approved.
7. Drawings or plans showing the jack layout, formwork, shoring, working, decks, and scaffolding must be available at the job-site for ready-reference.
8. Forms intended for use where there is a free fall of 6 feet or greater shall be equipped with adequate scaffolding guardrail, or employees working on the forms shall be protected from fall exposures at all times during forming and stripping operations (refer to Section 7.8).

#### **7.18.8 Placing and Removal of Forms**

1. Only personnel actually engaged in forming and stripping operations will be allowed in the immediate work area; appropriate warning signs and barriers will be used. Employees shall be equipped with and use hard hats, eye protection, gloves, and approved safety belts with lanyards. Employees will be instructed that when cutting tie wires under tension, care must be taken to prevent back lash which might hit the body, particularly the face, eyes or throat.
2. When forms are moved or raised by crane, cableway, A-frame, or similar mechanical device, forms shall be securely attached to wire slings. Use of No. 9 tie wire, fiber rope and similar makeshift lashing to support forms is prohibited. Tag lines will be used in moving panels or large sections of forms by crane or hoist. Panels and built up form

sections shall be equipped with metal hoisting brackets for attachments of slings.

3. Vertical forms being raised or removed in sections shall not be released until adequately braced or secured. Likewise, overhead forms shall not be released until adequately braced or secured.

#### **7.18.9 Slip Forms**

1. The steel rods or pipe on which the jacks climb or by which the forms are lifted shall be especially designed for that purpose. Such rods must be adequately braced where not encased in concrete.
2. Jacks and vertical supports shall be positioned in such a manner that the vertical loads are distributed equally and do not exceed the capacity of the jacks.
3. Jacks or other lifting devices should be provided with mechanical dogs or other automatic holding devices to protect against failure of the power supply or the lifting mechanism.
4. Lifting shall proceed steadily and uniformly and shall not exceed the predetermined safety rate of lift. A jacking system, which provides precise, simultaneous movement of the entire form in small preselected increments is recommended for large structures.
5. Lateral and diagonal bracing of the forms shall be provided to prevent excessive distortion of the structure during the sliding operation. While the slide is in operation, the form structure shall be maintained in line and plumb.
6. All vertical lift forms shall be provided with scaffolding or work platforms completely encircling the area of placement.
7. Workmen placing reinforcing steel ahead of the placement shall wear safety belts/harness tied off to lanyards or otherwise securely fastened when working above the scaffold level.

#### **7.18.10 Shoring**

1. Formwork, as previously discussed, will be designed, fabricated, erected, supported, braced and maintained to be capable of supporting all loads that may be applied to the formwork. Shoring, bracing and supports will be in conformance with ANSI A-10-9-1983. A false work plan or shoring layout shall be available on the job site.



2. Shoring equipment will be included in all drawings, plans, and revisions for jack layout, decks and scaffolds.
3. All shoring equipment (including spares used in re-shoring operations) must be inspected prior to erection to insure the equipment is in good shape and meets the specification in the formwork drawing. Damaged equipment will be removed from the project for repair or destruction.
4. Erected shoring will be inspected before, during and after the pour. Damaged or weakened shoring will be reinforced or replaced. Written certification is required for pre-placement inspection.

#### **7.18.11 Single Post Shores**

1. Single post shores must be designed by a qualified structural Engineer, vertically aligned, spliced to prevent misalignment and braced in two mutually perpendicular directions at the splice. Each tier will be similarly braced. Adjustment of the single post shores will not be made after the pour begins.
2. For stability, single post shores shall be horizontally braced in both the longitudinal and transversal directions, and diagonal bracing will be installed. Such bracing shall be installed as the shores are being erected.
3. Devices which attach to the external lateral stability bracing shall be securely fastened to the single post shores.
4. All baseplates or shore heads of single post shores shall be in firm contact with the footing sill and the form material.
5. When formwork is at an angle, or sloping, or when the surface shored form is sloping, the shoring shall be designed for such loading by a qualified Engineer.
6. Adjustments of single post shores to raise formwork shall not be made after placement of concrete.

#### **7.18.12 Re-shoring**

1. Re-shoring will be erected when the original shores are removed if the slab is required to support loads which exceed its capacity.
2. Re-shoring shall be thoroughly checked to determine that it is properly placed and that it has the load capacity to support the areas being re-shored.

3. When motorized carts are used, the design load shall be increased 25 pounds per square foot in all cases.
4. The sills for shoring shall be sound, rigid and capable of carrying the maximum intended load without settlement or displacement.
5. Reasonable precautions should be taken so that weather conditions do not change the load-carrying conditions of the soil below the minimum design.
6. When excessive earth disturbance has occurred, an Engineer or other qualified person shall supervise the compaction and reworking of the disturbed area and determine that it is capable of carrying the loads which are to be imposed upon it.

#### **7.18.13 Tubular Welded Frame Shoring**

1. All metal frame shoring equipment shall be inspected before erection.
2. Metal frame shoring equipment and accessories shall not be used if they are heavily rusted, bent, dented, rewelded, or have other defects.
3. All locking devices on frames and braces shall be in good working order, coupling pins shall align the frame or panel legs, pivoted in place, and all components shall be in a condition similar to that of original manufacture.
4. Devices which attach to the external lateral stability bracing shall be securely fastened to the legs of the shoring frames.
5. When formwork is installed at an angle, or sloping, or when the surface shored form is sloping, the shoring shall be designed for such loading by a qualified Engineer.

#### **7.18.14 Tube and Coupler Shoring**

1. All tube and coupler components shall be inspected before being used. Defective equipment will not be used.
2. Tubes of shoring structures shall not be used if they are heavily rusted, bent, dented or have other defects.
3. Couplers (clamps) shall not be used if they are deformed, broken or have defective or missing threads on bolts, or other defects.

4. All baseplates, shore heads, extension devices, or adjustment screws shall be in firm contact with the footing sill and the form materials, and shall be hung against the posts.
5. Eccentric loads on shore heads and similar members shall be prohibited unless the shore heads have been designed for such loading.
6. Special precautions shall be taken when formwork is at angles, or sloping, or when the surface shored form is sloping.

#### **7.18.15 Masonry Construction**

1. General

During erection, a limited access zone with appropriate barricades will be established. This zone will be equal to the height of the wall plus 4 feet and will remain until the wall is adequately braced or shored. In addition, masonry walls shall not be built higher than 8 feet, unless adequately braced or until provision is made for the prompt installation of permanent bracing at the floor or roof level immediately above the story under construction.

2. Saws

- a. Masonry saws shall be guarded by semicircular enclosures over the blade and by a slotted horizontal hinged bar mounted underneath the enclosure to retain fragments of the blade in case it should shatter while in use.
- b. A safety latch shall be installed on notched saws to prevent the motor and cutting head assembly from lifting out of the notches.
- c. Blade speed shall be maintained in accordance with the manufacturers' specifications.
- d. Stationary masonry saws shall be equipped with adequate dust collection and removal systems.
- e. The motor frames of all stationary saws shall be grounded through conduit, water pipe, or a driven ground. Portable saws shall be grounded through three-pole cords attached to grounded electrical systems wherever they are indicated to be part of the tool electrical connection.

- f. Saw operators shall wear approved safety glasses and face shields and hearing protection.
- g. Approved dust respirators shall be worn by personnel exposed to dust concentrations exceeding threshold limit values (TLV).
- h. Masonry saws shall be inspected at regular intervals and maintained in safe operating condition.

#### **7.18.16 Masons' Scaffolds**

Masons' scaffolds shall be designed, constructed, and maintained in accordance with American National Standard Safety Requirement for Scaffolding, under the direct supervision of a Competent Person. They shall be maintained in safe condition, and tools, materials and debris shall not be allowed to accumulate in quantities such as to create a hazard.

#### **7.18.17 Material Handling, Storage and Use**

- 1. All material bags, containers, or bundles, and other material stored in tiers must be stacked, blocked, interlocked and limited in height so that they will be stable and safe against sliding or collapse.
- 2. Maximum safe load limits of floors within buildings and structures in pounds per square foot, must be conspicuously posted in all storage areas, except for floors or slabs on grade. Maximum safe loads shall not be exceeded.
- 3. Aisles and passageways shall be kept clear to provide for the free and safe movement of material handling equipment or employees. Such areas must be kept in good repair.
- 4. Material stored inside buildings under construction must not be placed within 6 feet of any hoistway or floor openings, nor within 10 feet of an exterior wall which does not extend above the top of the materials stored.
- 5. Employees required to work on stored material in silos, hoppers, tanks, and similar storage areas must be equipped with lifelines and safety belts.
- 6. Overloading floors or roof with building materials shall be prevented by preplanning safe loading arrangements and design load restrictions.

#### **7.18.18 Cement Handling**

Bags of cement and mortar will be stacked in an orderly manner in order to maintain stable piles, stepping back the layers and cross keying the bags at least every ten bags high. Bags must be removed uniformly from the top of the piles to avoid tipping of the stacks. Broken pallets and empty bags must be disposed of promptly to eliminate fire and tripping hazards.

#### **7.18.19 Brick Storage**

1. Brick shall not be piled on uneven or soft ground, but should be stacked on planks, except where the surface is of asphalt or concrete.
2. Brick shall not be stacked for storage purposes on scaffolds. This practice does not prohibit normal supplies on bricklayers' scaffolds during actual bricklaying operations.
3. Brick stacks must not be more than 7 feet in height. When a loose brick stack reaches a height of 4 feet, it must be tapered back 2 inches for every foot of height above the 4-foot level.

#### **7.18.20 Partition Blocks**

Blocks shall always be stacked in tiers on solid, level surfaces. Stacked piles are to be limited to a height of 6 feet whenever possible. If blocks are stacked higher than 6 feet, the pile must be stepped back one-half block per tier above the 6 foot level, to prevent the pile from toppling.

#### **7.18.21 Sand, Gravel and Crushed Stone**

If these materials are to be stored against walls or partitions, extreme care will be taken to ensure that the stability of such structures are not endangered due to the weight of the stored materials.

### **7.19 Pre-Cast Concrete**

Pre-cast concrete units, structures, and tilt-up wall panels must be adequately supported to prevent overturning and to prevent collapse until permanent connections are completed.

#### **7.19.1 Lifting Devices**

1. Tools and strand devices shall be kept clean and in good repair.

2. Lifting inserts that are embedded or attached to concrete members, other than tilt up, shall be capable of supporting at least four times the maximum intended load applied to them. Lifting devices for other pre-cast members must be capable of supporting five times the load. Only those employees essential to the operation will be allowed in the immediate vicinity of pre-cast lifting or tilt-up.
3. Vacuum lifting devices must be applied only to smooth clean surfaces. An automatic cutoff must be provided to prevent loss of suction in the event of failure of the compressor power source, tank, lines or other attachments.
4. Panels must be securely and adequately braced in final positions, and bracing shall remain in place until sufficient support is provided by portions of the final structure. Standing vertical panels shall be braced to withstand 10 lbs./ sq.ft. wind load during construction, and are to be protected against possible impact by moving vehicles or equipment.

An erection plan and procedure must be prepared by a Civil Engineer registered in the state of Utah and kept available at the job site. Field Modifications must to be approved by the responsible Engineer and added to the plan and procedure kept at the job site. Concrete erection stresses, lift point attachments and locations in tilted up concrete panels shall be designed by a currently Registered Engineer. Plans shall be available at the site.

#### **7.19.2 Jacking Equipment**

Jacking equipment shall not be loaded beyond its safe working capacity, and the threaded rods and other members that transmit loads to the jacks shall have a minimum safety factor of 2.5. Jacking equipment used in lift slab operation shall meet the following requirements:

1. Jacks shall be so designed and installed so that they will not continue to lift when overloaded.
2. Jacks shall be installed with a safety device which will enable them to continue to support the load in any position should the jack malfunction and lose its lifting ability.
3. The maximum number of plainly controlled jacks on one slab shall be limited to 14, and in no event should the number be too great to permit the operator to maintain the slab level within specified tolerances.

### **7.19.3 Uniform Lifting**

1. Jacking operations shall be synchronized in such a manner as to ensure even uniform lifting of the slab. If leveling is automatically controlled, a device shall be installed which will stop the operation when the two-inch tolerance is exceeded or when there is a malfunction in the jacking system. If level is maintained by plan controls, such controls shall be located in a central location and attended by a trained operator while lifting is in progress.
2. No one shall be permitted under the slab during jacking operations.

### **7.20 Pipelines**

Trenching and Excavation Operations are covered by Section 6.14 of this document.

1. While the excavation is open, existing underground installations adjacent to or crossing the excavation shall be protected, supported or removed as necessary to safeguard employees. Each employee entering an excavation 4 ft. or greater in depth must be protected from cave-ins.
2. A ladder or other safe means of egress shall be located in the trench excavations 4 feet or greater in depth, within 25 feet of employees in the excavation.
3. Employees exposed to vehicular traffic shall be provided and required to wear warning vests. Encroachment upon public streets or highways will require a system of traffic controls. Flaggers are required where barricades and warning signs cannot control the moving traffic. Flaggers shall be trained in proper methods of flagging moving traffic.
4. No employee will be permitted underneath loads handled by lifting or digging equipment. Employees must stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling material.
5. When mobile equipment operating adjacent to an excavation or required to approach the edge of the excavation, and the operator does not have a clear and direct view of the edge, a warning system must be utilized such as barricades, hand signals, or stop logs. This operation may place an unacceptable surcharge on the shoring system and require design by a registered Engineer.

6. Hazardous atmospheres require adequate precautions to provide oxygen content of 19.5% or greater and prevent concentrations in excess of 10% of the LED of flammable substances. Entry and work inside the pipelines and its structures will require prior planning of work procedures as spelled out in section 7.10 of this document.
7. Water Accumulation: Employees shall not work in excavations in which there is accumulating water until proper precautions are taken. These will vary but could include special support or shield systems to protect from cave-ins, water removal may require a gravel layer to allow water migration to a pump. Deterring wells adjacent to the excavation may be required. Water removal, if required, shall be monitored by a Competent Person. Excavations cutting across natural drainage channels or sloping ground may require diversion ditches, dikes or piping to prevent surface water entering the excavation.
8. The pipe laying site and adjacent related areas require daily inspections by the Competent Person for evidence of possible cave-in, failure of protective systems or other hazards relating to the pipe laying operation. Hazardous conditions will require correction prior to work in that area.
9. Where employees or equipment are required or permitted to cross over excavations over 6 feet deep and wider than 30 inches bridges with guard rails will be provided. Spectators or employees not required for the work should not be allowed within 10 ft. of the trench and pipe laying operations.
10. The removal of existing asbestos cement pipe lines may expose employees to asbestos. This operation will require persons with specialized training for removal and disposal of the pipe.

## **7.21 Cranes and Hoisting Equipment**

1. Cranes and hoists, shall not be used without a current annual certificate of examination and testing issued by an accredited crane examiner.
2. Cranes or hoisting equipment shall be operated only by qualified and designated personnel. A written test must be taken and successfully completed before personnel are allowed to operate a crane or other hoisting equipment.
3. Crane operators shall make a written inspection of their equipment prior to its first operation on any work shift. A written inspection by a qualified person is required every 750 operating hours or every 3



months which ever comes first. Documentation must be available at the site for review (see Appendix K) (refer to GIGO 5031).

4. Rated load capacities and recommended operating speeds, special hazard warnings, or instructions, shall be conspicuously posted on all equipment; they shall be visible to the operator from his/her control station, and an accessible fire extinguisher of 10ABC rating, shall be available at all operator stations or cabs of equipment. Crane operations position shall be kept clear of loose tools or material.
5. Loads shall be attached to the hook by means of slings or other suitable rigging to insure the safe handling of the load (refer to safe rigging section). Hook or ball painted white or yellow may be visible in poor visibility situations.
6. A signaler (only one) using the uniform hand signals, (see signal chart) shall be used to direct the operator when the point of operation is not in direct view of the operator, unless a radio or other positive means of communication is used.
7. The operator shall respond to signals from only one person. The operator shall not follow any signal which is not understood, but shall always obey a stop signal.
8. The operator shall be responsible for the operations and load under his/her control at all times. Whenever there are doubts about the safety of movement, the operator shall stop operations until safety is assured.
9. A warning signal, such as a horn, shall be sounded to alert personnel to proximity of moving loads. Loads should not be passed over personnel, and personnel should not be permitted to work in the area directly under a suspended load.

Concrete buckets - No employee shall be permitted to work under concrete buckets while the buckets are elevated.

To the extent practical, elevated concrete buckets shall be routed so that no employees, or the fewest number of employees, are exposed to the hazards associated with falling concrete buckets.(Employees shall keep out from under suspended loads at all times.)

10. Cranes shall not be operated or loads handled in such a manner that any machine part or load will come within ten feet of electrical lines carrying 50,000 volts or less. Greater distances are required for lines carrying over 50,000 volts. Post warning sign in plain view of operator.

11. No person shall be permitted to ride on loads, slings, hooks, buckets or other such load handling attachments.
12. All repairs, adjustments, modifications, rigging assembly or dismantling shall be conducted only by qualified and authorized personnel.
13. Rotating cranes shall be barricaded or other positive means shall be taken to prevent personnel from entering the area between the rotating machine deck, and any stationary machine parts or outside obstructions.
14. A critical lift checklist will be completed anytime:
  - a. Two cranes are used to make a lift,
  - b. When a lift is within 90% of the load chart, or
  - c. Any unusual conditions are encountered (see Appendix C).
15. Crane suspended work platforms will only be used if there is no other safe means to reach the work area. The Contractor will complete a JSA and a JSA will be completed and review acceptance by the UDOT Safety Risk Manager or his designee prior to the lift.
16. Any overhead wire shall be considered to be energized unless and until the person owning such line or operating officials of the electrical utility supplying the line assures that it is **NOT ENERGIZED** and it has been visibly grounded at the work site.
17. Operation adjacent to overhead lines are prohibited unless at least one of the following conditions is satisfied:
  - a. Power has been shut off and positive means taken to prevent the lines from being energized. Visible grounding is required.
  - b. The operation, erection, handling, or transportation of tools, machinery, materials, structures, scaffolds, or the moving of any house or other building, or any other activity where any parts of the above or any part of an employee's body will come closer than the minimum clearances from energized overhead lines as set forth in Table 1 shall be prohibited.

Operation of boom-type equipment shall conform to the minimum, clearances set forth in Table 2, except in transit where the boom

is lowered and there is no load attached, in which case the distances specified in Table 1 shall apply.

**TABLE 1**

General Clearances Required from Energized Overhead High-Voltage Conductors:

Nominal Voltage (Phase to Phase)	Minimum Required Clearance (Feet)
600 . . . . . 50,000	6
over 50,000. . . . 345,000	10
over 345,000. . . . 750,000	16
over 750,000 . . . 1,000,000	20

**TABLE 2**

Boom-type lifting or hoisting equipment clearances required from energized overhead high-voltage lines.

Nominal Voltage (Phase to Phase)	Minimum Required Clearance (Feet)
600 . . . . . 50,000	10
over 50,000 . . . . . 75,000	11
over 75,000 . . . . . 125,000	13
over 125,000 . . . . . 175,000	15
over 175,000 . . . . . 250,000	17
over 250,000 . . . . . 370,000	21
over 370,000 . . . . . 550,000	27
over 550,000 . . . . . 1,000,000	42

18. Work activity which could affect or be affected by overhead lines shall not be initiated until coordinated with the local and appropriate utility officials.
19. Overhead transmission and distribution lines shall be carried on tower or poles which provide safe clearances over roadways, structures, vehicles and for the operation of construction equipment.

## **7.22 Rigging**

No lifting or hoisting operation can be safe unless properly rigged. The following policies are provided to help insure that operations involving hoisting and the application of ropes, slings, chains and accessories are done safely. For further information consult the Bureau of Reclamation "Construction Safety Standards" and the Construction Safety Association of Ontario "Rigging Manual".

### **7.22.1 Responsibilities**

1. Planning: Major rigging operations must be planned and supervised by Competent Personnel to ensure that the best methods and most suitable equipment and tackle are employed. This should be the superintendent or foreman in charge.
2. Supply and Care of Rigging Equipment: Job management must ensure that:
  - a. Proper rigging equipment is available.
  - b. Inspect all rigging before use and periodic documented inspections are required (see Appendix J).
  - c. Correct load ratings are available for the material and equipment used for rigging.
  - d. Rigging material and equipment are maintained in proper working condition.
3. Rigging Operation: The supervisor of the hoisting operation should be responsible for:
  - a. Proper rigging of the load.
  - b. Supervision of the rigging crew.
  - c. Ensuring that the rigging material and equipment have the necessary capacity for the job and are in safe condition.
  - d. Ensuring correct assembly of rigging material or equipment as required during the operation, such as the correct installation of lifting bolts.
  - e. Safety of the rigging crew and other personnel as they are affected by the rigging operation.

#### **7.22.2 General Rigging Procedures and Precautions**

1. Know the safe working load of the equipment and tackle being used. NEVER exceed this limit.
2. Determine the weight of the load before rigging it.
3. Examine all hardware, equipment, tackle and slings before use and destroy defective components.
4. If you think equipment or rigging is unsafe, report it to your supervisor immediately. Do not use it until deemed safe.  
  
\* Illustrations and Tables in this Section are courtesy of the Construction Safety Association of Ontario.
5. Never carry out rigging or hoisting operations if weather creates a

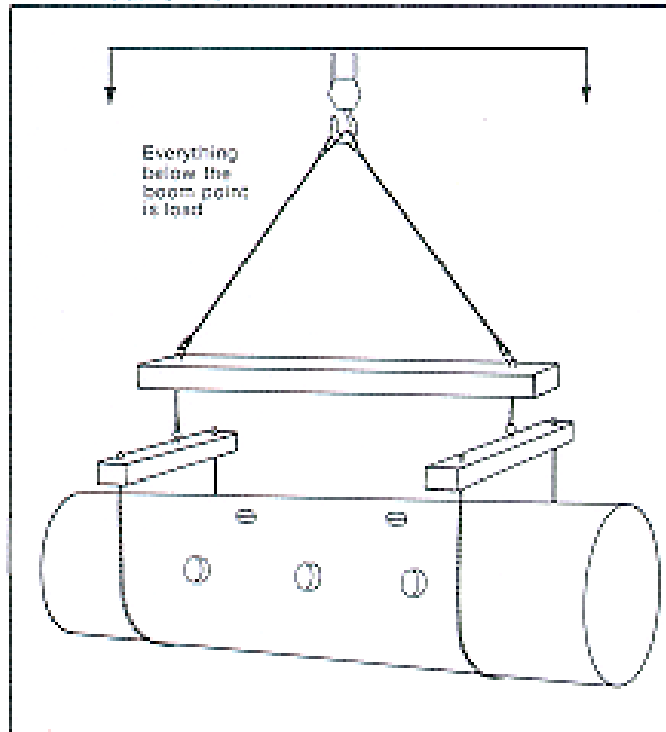
hazard to personnel, equipment, property or the public. Rated hoisting capacities should be de-rated when winds exceed 20 mph.

6. Whenever the temperature is below freezing (32 degrees F), extreme caution must be exercised to ensure that no part of the hoist or crane structure or rigging is shock loaded or impacted as brittle fracture of the steel can result.
7. The most repeated killer of riggers and those persons handling loads is electrocution caused by the contact of the boom, load line or load of a crane with electric power lines. Observe distance limitations and other precautions whenever working around energized powerline. Crane and other boom type equipment must have high voltage warning signs posted in view of operator.
8. The load must always be kept below the boom point or upper load block. Sideloads reduces stability and introduces stresses for which the equipment is not designed. Rapid swinging also reduces stability. Observe all of these precautions.
9. Remember, you must take into account the weight of hook blocks, hooks, slings, equalizer beams, material handling equipment, etc., in determining the maximum allowable load you can handle.

**As shown:**

All Rigging Equipment Must be Counted as Part of the Load

Fig. 7.8 All Rigging Equipment Must be Counted as Part of the Load



10. Job fabricated rigging hardware may be used only if:
  - a. It is designed and certified by a licensed, qualified Engineer
  - b. It is tested to 125% of the rated working load.
  - c. It is clearly and permanently marked with its rated load.

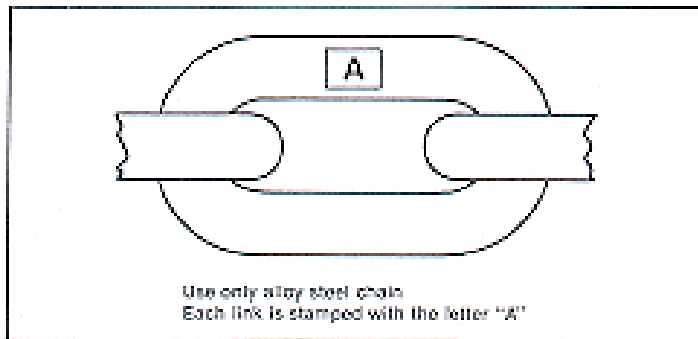
**All three conditions must be satisfied.**

### 7.22.3 Chain

1. Only alloy steel chain will be used for hoisting purposes. It is normally stamped with an "A" on each link.

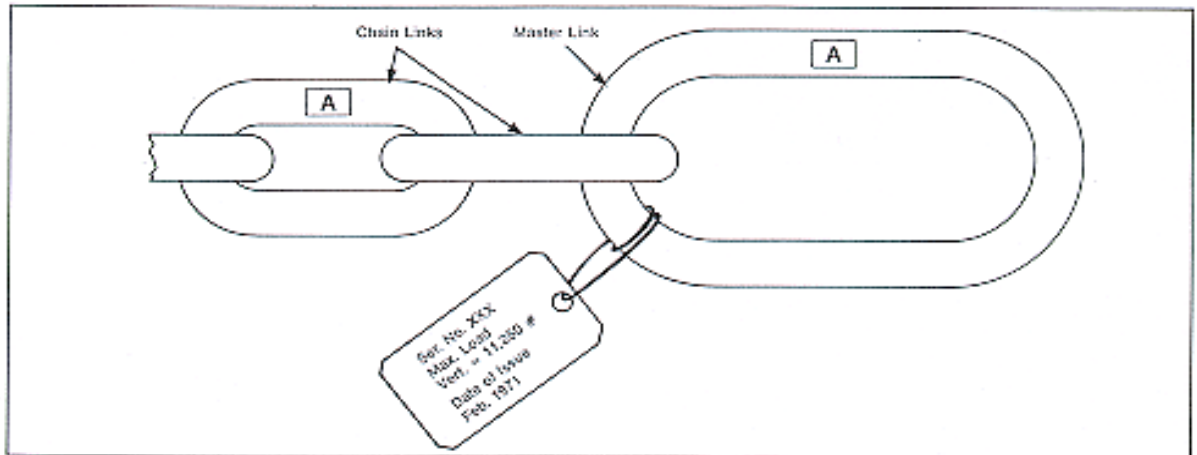
**As shown:** Identification of Alloy Steel Chain.

Fig. 3.1 Identification of Alloy Steel Chain



2. Each chain must have an I.D. tag as shown below:  
Every Chain Should Have an Identification Tag

Fig. 3.2 Every Chain Should Have an Identification Tag



3. Never jerk or impact-load a chain.
4. Never twist or knot a chain.

Fig. 3.7 Never Twist or Knot a Chain



Don't  
Twist



Don't  
Knot

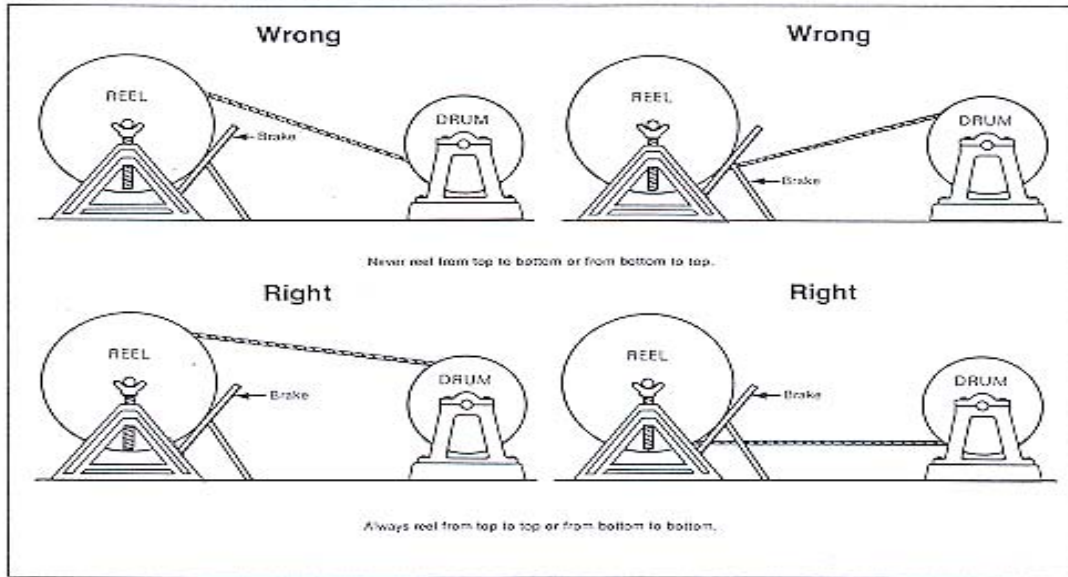


## 7.22.4 Wire Rope

1. The safe working load for wire rope will not be exceeded.
2. When replacing wire rope on a crane, follow the manufacturer's recommendations. Spool the rope properly to prevent twisting, kinking, etc. as shown.

### Methods of Winding Rope from Reel to Drum or Reel to Reel

Fig. 1.24 Methods of Winding Rope from Reel to Drum or Reel to Reel



3. When wedge socket fastener is used, it should be installed as shown below:

Fig. 1.70 Proper Method of Securing Dead End of Rope When Using a Wedge Socket

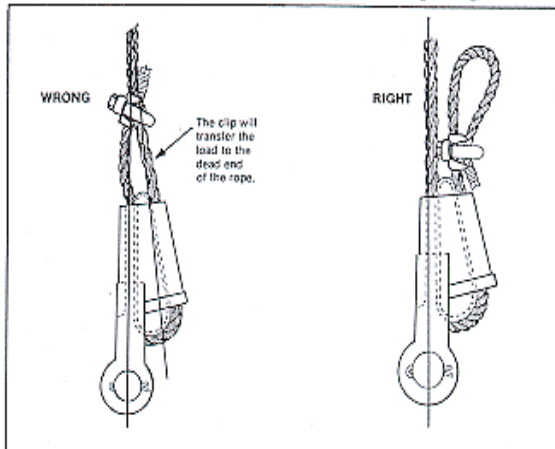
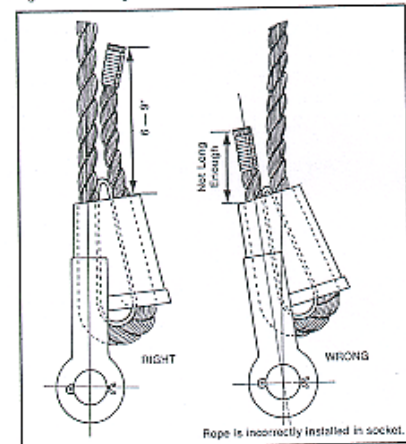


Fig. 1.71 Installing a Wedge Socket on a Rope



4. Wire rope clips will not be used to form eyes or to make wire rope splices.
5. Wire rope with one or more of the following defects will be removed and replaced:

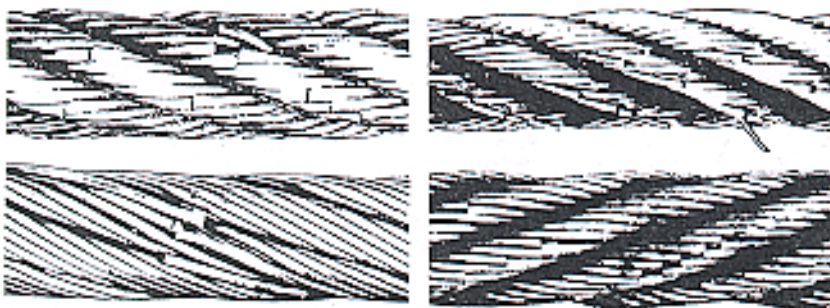
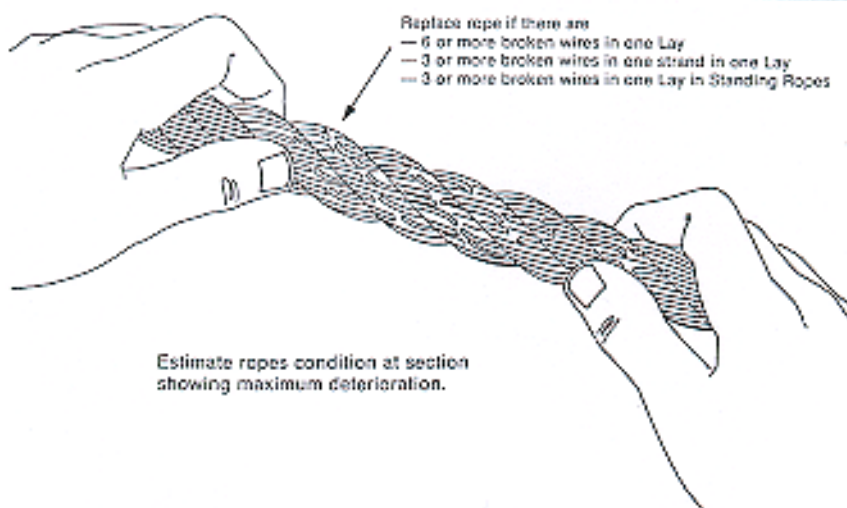
A. **Corrosion:**

Corrosion may result from acids or alkalies. Rust film which has not resulted in pitting or loss of the original individual wire diameter should be removed and the rope lubricated.

B. **Broken wire:**

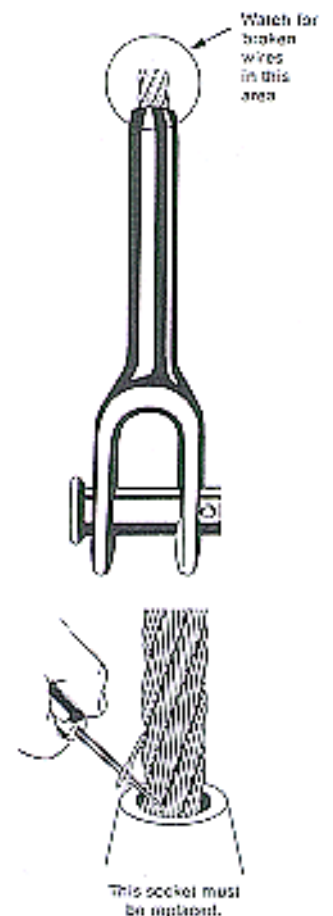
- 1) One or more valley breaks. (A valley break is an individual wire break occurring in the valley between two adjacent strands.)
- 2) Six randomly broken wires in one wire rope lay or three wires in one strand in any one lay.

Fig. 1.41 Rope Replacement Criteria Based on the Number of Broken Wires



These ropes exhibit wire breaks caused by fatigue after repeated bending over sheaves of the proper size and under moderate loads.

Fig. 1.42 Broken Wires Near Fittings



- C. **Abrasion:** Abrasion, scrubbing, flattening, or peening resulting in loss or more than one-third the original diameter of the outside wires.
- D. **Kinking:** Kinking, crushing, bird caging, or other damage resulting in distortion of the rope structure.
- E. **Heat Damage:** Evidence of heat damage resulting from a torch, excessive friction, or contact with electrical wires.
- F. **Reduction in diameter.** Reductions from nominal diameter of more than  $\frac{3}{64}$  inch for rope diameters up to and including  $\frac{3}{4}$  inch, or more than  $\frac{1}{16}$  inch for diameter  $\frac{7}{8}$  to  $1\frac{1}{8}$  inches, and of more than  $\frac{3}{32}$  inch for rope diameters  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches.

Fig. 1.45 Reduction in Rope Diameter

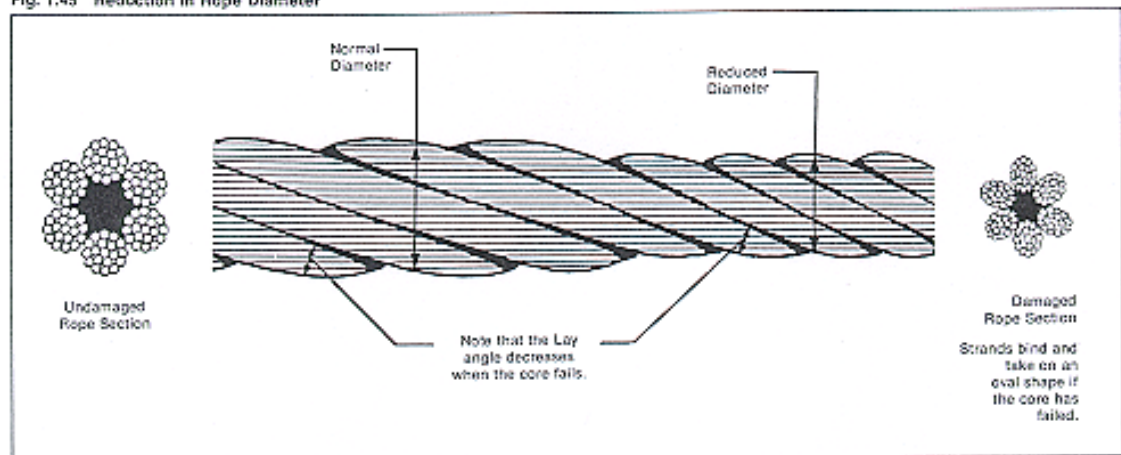
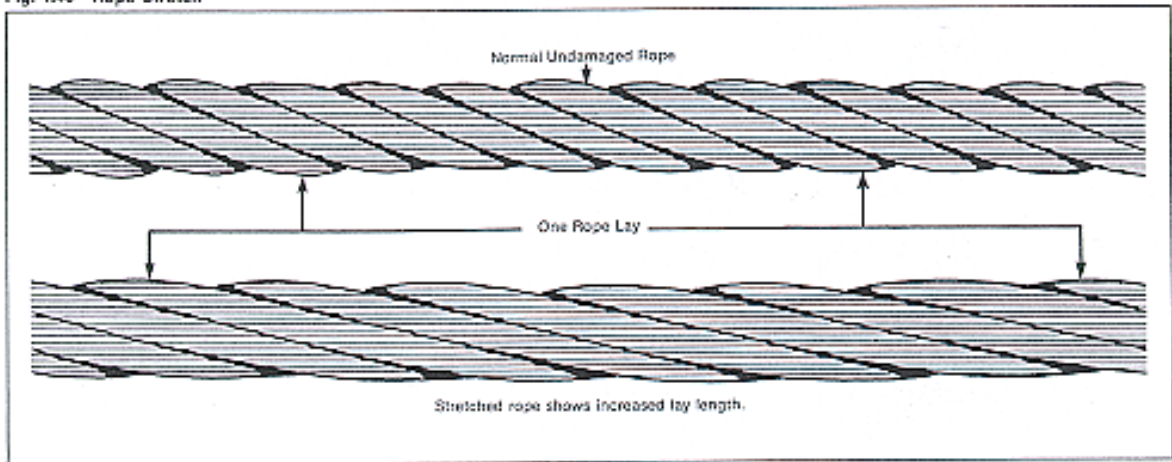


Fig. 1.46 Rope Stretch



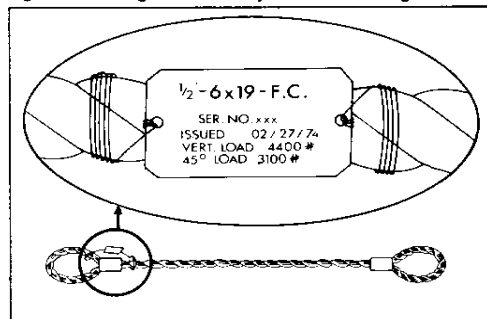
6. If two or more broken wires or corrosion are found adjacent to a socket or end fitting, the wire rope will be re-socketed or removed from service.
7. Defective wire rope should be cut up and discarded or painted "safety orange" or "safety red" to identify it as defective.

#### 7.22.5 Slings

1. Safe working loads will not be exceeded.
2. All slings should be equipped with I.D. tags as shown below:

All Slings Should Carry Identification Tags

Fig. 7.9 All Slings Should Carry Identification Tags



3. Synthetic web slings are recommended for certain applications where they have advantages as shown. They are also light in weight and easy to handle.

## Metal End Fittings (illustrations)

Fig. 6.22 Synthetic Web Slings do not Damage or Crush Like Wire Ropes or Chain

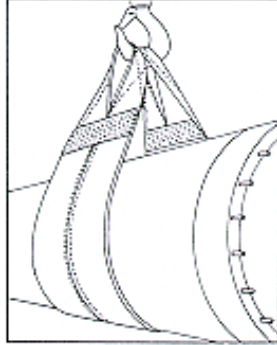
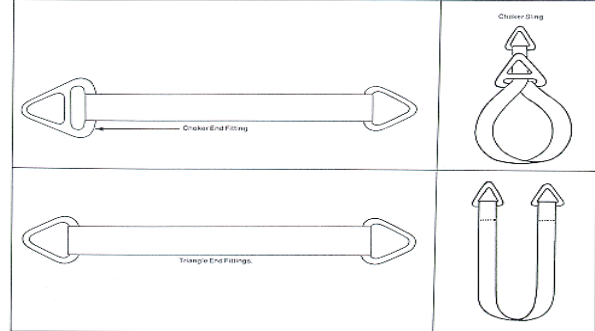


Fig. 6.27 Metal End Fittings



4. Synthetic web slings have wear indicators (usually red threads embedded in the fabric). Discard the sling when the wear indicators begin to show. Discard cut or frayed synthetic slings. Use softeners and wraps to prevent severe wearing from rough concrete surfaces or sharp metal.
5. Synthetic web slings are sensitive to fumes, vapors, sprays, mists, or liquids of acids or phenolic. Avoid exposure to any of these.
6. Whenever having wire rope slings made up, get a flemish eye with pressed metal sleeve and a thimble. The thimble prevents crushing and abnormal wear.
7. The following illustrations are some basic safe working rules and applications for rigging with slings.

Fig. 6.2 2-Leg Bridle Hitches

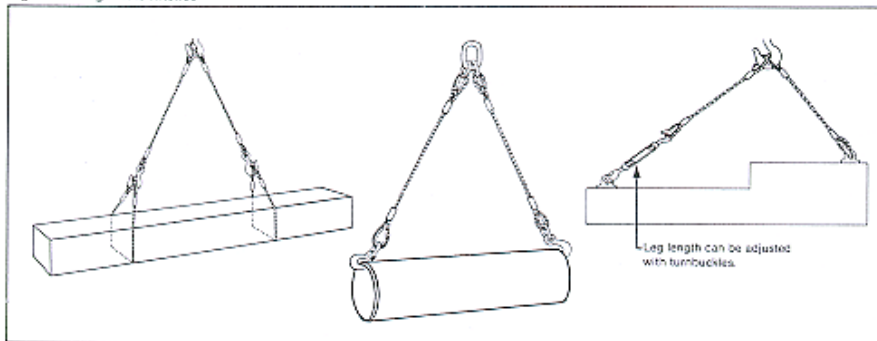


Fig. 6.23 Pipe handling illustrates the tendency of webbing slings to mold themselves to the load. This allows handling irregularly shaped loads securely.

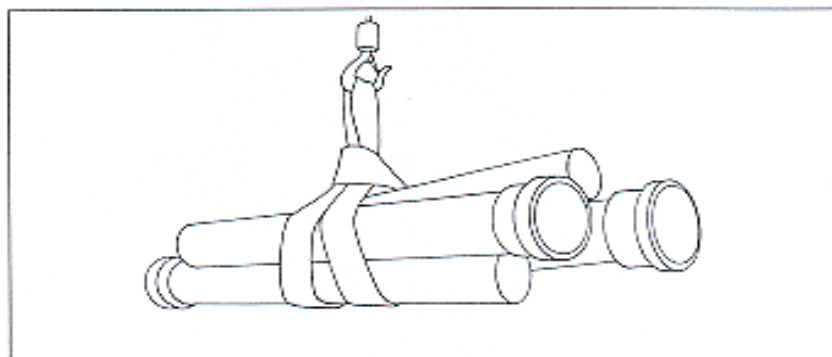


Fig. 6.3 3-Leg Bridle Hitch

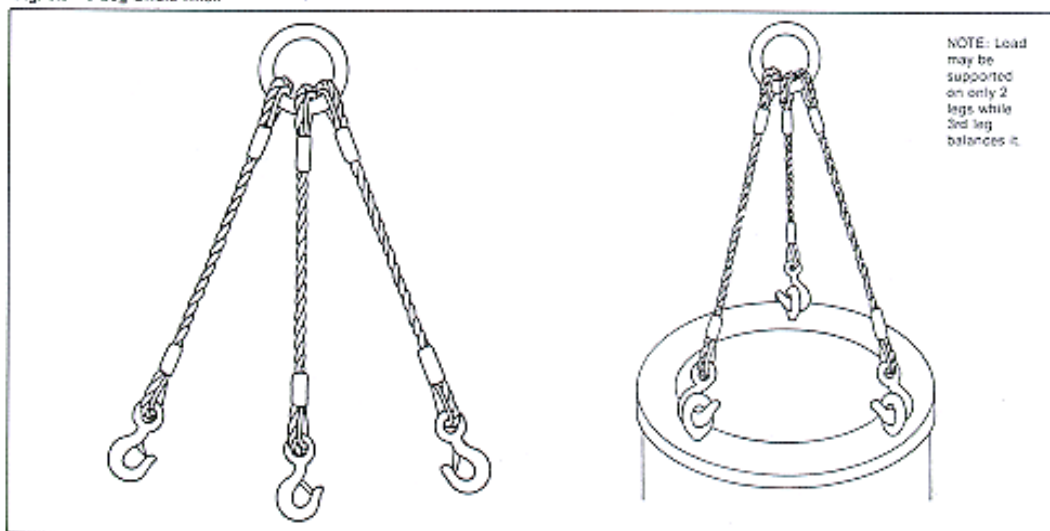


Fig. 7.10 Ensure that Slings are Protected at All Sharp Corners on Heavy Items

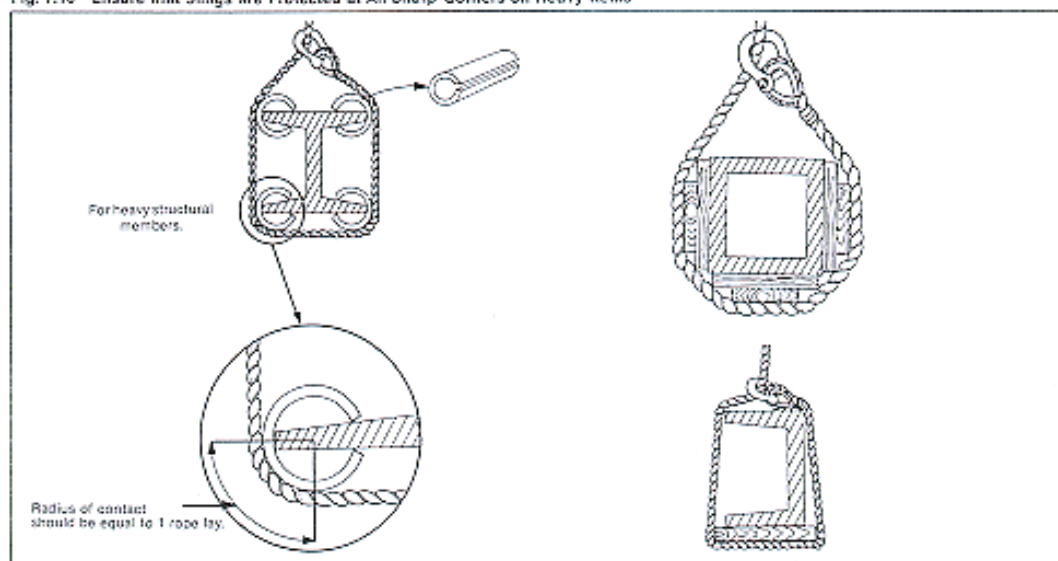




Fig. 7.14 On a Rigid Object the Load Could Be Carried On Only 2 Legs or Sling While Other Legs Only Serve to Balance.

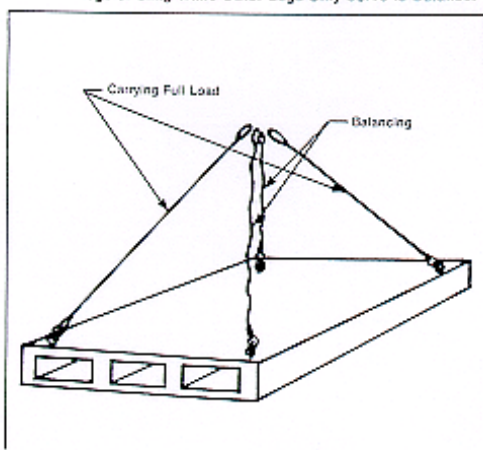


Fig. 7.15 Know What the Load in Each Sling Leg will be Before the Lift is Made

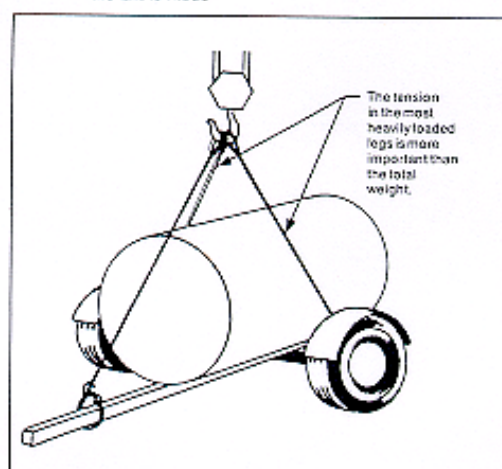
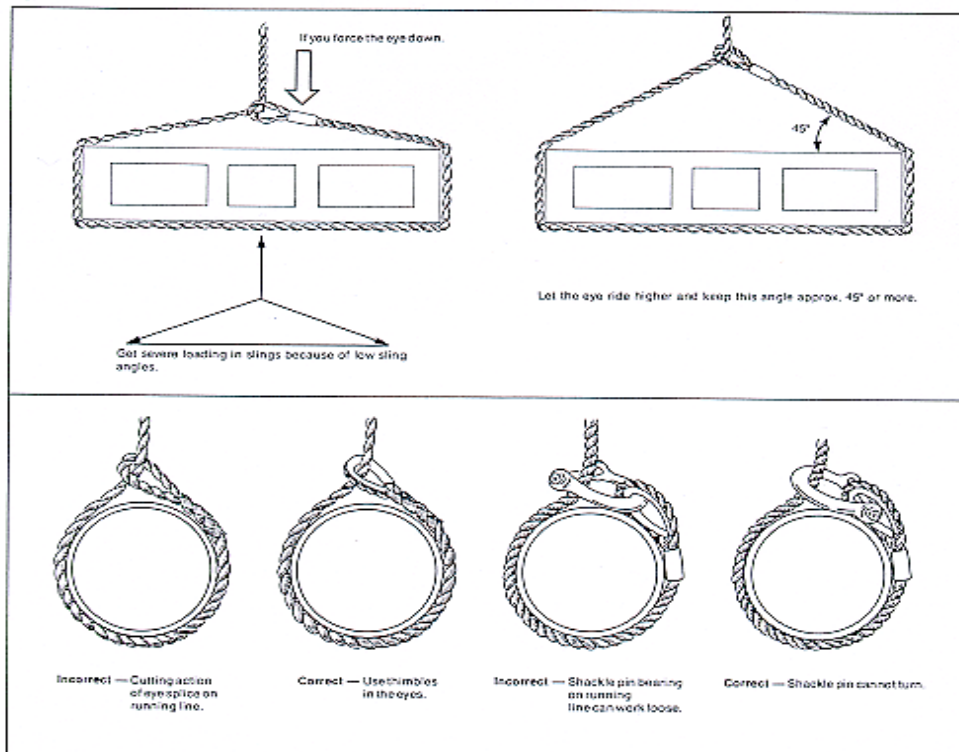


Fig. 7.16





## **7.23 Earthmoving Equipment and Trucks**

1. All earthmoving equipment shall be maintained in safe working condition and shall be appropriate and adequate for the intended use.
2. A written pre-shift safety inspection shall be performed on all equipment. Documentation shall remain in vehicle during the work shift. Equipment with identified safety defects shall be kept out of service until repaired.
3. Equipment shall be operated only by authorized personnel. Operators of equipment, machinery or vehicles shall be qualified and properly licensed for the operation involved.
4. Equipment maintenance is to be performed only by qualified mechanics.
5. Equipment operators and truck drivers will make a documented pre-shift safety inspection of their equipment and any conditions that effect safe operation will be corrected before further use.
6. Equipment shall not be operated unless all required safety devices are in place and functioning properly.
7. Careless, reckless or otherwise unsafe operation or use of equipment shall result in discipline and may constitute grounds for dismissal.
8. Before performing any service or repair work, all equipment shall be stopped and positively secured against movement or operation, locked and tagged out of service, unless it is designed to be serviced while running, following the manufacturer's instructions.
9. When equipment is serviced or repaired, the operator shall dismount until the service or repair is completed and then make a complete walk-around safety check before remounting.
10. All bi-directional earthmoving equipment and motor vehicles with an obstructed view to the rear shall be equipped with a warning horn and an automatic back-up alarm that can be heard above and distinguished from the surrounding noise level.
11. All off-highway earthmoving equipment and trucks, such as loaders, dozers, scrapers, motor graders, rock trucks, tractors, rollers and compactors shall be equipped with roll-over protective structures (ROPS) and seat belts.

12. Seat safety belts shall be installed on and used by the operators of equipment provided with ROPS. One hundred percent seat belt use is mandatory.
13. Mobile equipment shall not be left unattended unless parked securely to prevent movement, with all ground engaging tools lowered to the ground, brakes set and the engine off.
14. Equipment parked at night shall be lighted, barricaded or otherwise clearly marked by the use of reflectors or reflective tape on all sides when used at any time within UDOT rights of way.
15. Personnel shall not be transported or ride on equipment or vehicles that are not equipped with seats and seat belts for passengers.
16. When fueling equipment or vehicles with gasoline or liquefied petroleum gas (LPG) the engine shall be shut down.
17. All equipment and vehicles shall be equipped with appropriate fire extinguisher or fire suppression system.
18. Haul roads shall be designed, constructed and maintained for safe operation consistent with the type of haulage equipment in use. Standard traffic control signs shall be used where necessary.
19. Elevated roadways shall have axle high berms or guards maintained on their outer banks.
20. Equipment, tools, and materials hauled on pickups and flat bed trucks must be secured to prevent them from falling onto the road.
21. Equipment, pickups and passenger vehicles not necessary for performing the work should be parked well away from the work area to reduce congestion and avoid collisions.

## **7.24 Hot Work**

Hot work is any process, which because of its design or function can cause ignition of a gaseous or vaporous atmosphere due to direct or indirect contact. Examples include welding, cutting, burning, soldering, grinding, etc.

### **7.24.1 Responsibilities**

All hot work must be planned and supervised by competent personnel to ensure that sufficient safety and health procedures are met.

### 7.24.2 General Requirements

1. No tasks that produce heat, sparks, or energy sufficient to serve as an ignition source may begin in any location that could potentially have ignitable atmospheres, until a JSA has been instituted and a Hot Work Checklist has been completed.
2. Each Contractor is responsible for issuing a Hot Work Checklist prior to starting any hot work.
3. All Hot Work Checklists must be reissued at the beginning of each day, each work shift, or if the area has not been monitored within 1 hour. Copies of permits must be kept on file and available for Engineer=s review.
4. All welding and cutting equipment and operations shall be in accordance with standards and recommended practices of the American Welding Society, Safety in Welding and Cutting, ANSI Z49.1, and the recommendations of the NFPA.
5. Contact lenses shall not be permitted while welding or cutting.
6. Hot Work Checklist (see Appendix I) must be issued before these operations may begin.
7. Transformer-type electric welding apparatus shall comply with ANSI C33.2 and shall be installed, maintained, and operated in accordance with the NEC. Welders and generators used on UDOT projects must have a daily, pre-shift written safety inspection completed before use.
8. Gas welding and cutting equipment shall be listed by Underwriters' Laboratories, (UL) Inc. Chicago, Illinois or by Factory Mutual Laboratories, Boston, Mass.
9. Employees shall be instructed in the safe use of welding equipment. Employees who have not received instructions shall not be allowed to use equipment.
10. All welding equipment shall be inspected daily. Defective equipment shall be removed from service, replaced, or repaired and reinspected before again being placed in service. Each welding or cutting unit shall be equipped with a compatible fire extinguisher.
11. Compatible fire extinguishing equipment shall be provided in the immediate vicinity of the welding or torch operation whenever combustible material is exposed.

12. Proper precautions (isolating welding and cutting, removing fire hazards from the vicinity, providing a fire watch, etc.) for fire prevention shall be taken in areas where welding or other "hot work" is being done.
13. Objects to be welded, cut, or heated shall be moved to a safe location or, if they cannot be moved, all moveable fire hazards in the vicinity shall be taken to a safe place or the combustible material and construction shall be protected from the heat, sparks, and slag of welding by suitable screens.
14. The areas where the floor, walls, or ground cover are combustible, should be protected by spraying the area with water, spreading damp sand, laying sheet metal, or by an equivalent means of protection. The contractor may have to assign a fire watch whenever welding in combustible surroundings.
15. Workers and the public shall be shielded from welding rays, heat, flashes, sparks, molten metal, toxic gases, toxic fumes, and slag.
16. Cable, hoses, and other equipment shall be kept clear of passageways, ladders, and stairways.
17. All hollow spaces, cavities, or containers shall be vented to permit the escape of air or gases before preheating, cutting, or welding. Department of Transportation, Office of Pipeline Safety, 49 CFR Part 192, Minimum Federal Standards for Gas Pipelines, shall apply when welding, cutting, and heating on steel pipelines containing natural gas. Pipelines containing gases or flammable liquids or conduits containing electrical circuits shall not be used as a ground return.
18. When welding or cutting must be done in a location where combustible or flammable materials are located, inspection, and written authorization by the designated authority shall be required before such operations are begun. The location shall be checked for latent fires after the work is completed.
19. Cylinders shall be kept beyond the range of sparks, hot slag, or flame.
20. Fuel gas and oxygen cylinders must be stored at least 20 feet apart or on opposite sides of a fire wall, outside the range of falling debris and away from heavy traffic areas when not in use.
21. Cylinders must be kept upright and secured.

22. Cylinder storage areas must be clear of combustibles, including fuels, and be designated as "no smoking" areas. Proper placarding should be used.
23. Compressed gas cylinders shall be stored, handled, and used in accordance with standards of the Compressed Gas Association. Cylinders should never be dropped, dragged, or struck in any way.
24. Positive mechanical and/or personal protective measures shall be taken when welding, cutting, or heating metals of toxic significance in enclosed spaces.
25. Oxygen shall not be used for ventilation, comfort cooling, blowing dust from clothing for pneumatic tool use, to start internal combustion engines, to blow out pipelines, to create pressure, to fill tires or for cleaning the work area. Pure oxygen is extremely dangerous. It can set fire to oil or grease without flame or spark.
26. Fuel gases such as propane and acetylene can be as dangerous as oxygen at pressures above 15 psi; in certain mixtures with oxygen. acetylene can spontaneously explode. Propane, which is heavier than air, can accumulate below grade level and be ignited by sparks, pilot lights, and other sources of combustion.
27. Before welding, cutting, or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.
28. Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable, they shall be stripped from the area to be heated to prevent ignition.
29. In enclosed spaces, all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application. Employees shall be protected by air line respirators.
30. In the open air, workers shall be protected against toxic preservative coatings by a respirator that meets requirements of NIOSH.
31. Preservative coatings shall be removed a sufficient distance from the area to be heated to ensure that the temperature of the unstripped metal shall not be appreciably raised.

32. When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire and instructed in anticipated fire hazards and how fire fighting equipment is to be used.
33. Flash arrestors must be installed within the fuel and oxygen lines on all gas cutting cylinders. A flash arrestor, in the case of a flashback, will stop the flame from reaching the fuel source. Flash arrestors should be inspected every six months or after a flashback, whichever comes first. If flash arrestors appear clogged with carbon soot or discolored by heat they should be replaced. Most gauges have a built in "backflow" mechanism that will prevent mixing of gases but will not prevent fire from entering the gauges.
34. Hose which has been subject to flashback, or which shows severe wear or damage, shall be tested to twice the normal pressure to which it is subject but in no case less than 300 psi. Defective hose, or hose in doubtful condition, shall not be used.
35. No welding, cutting, or heating shall be done where the application of flammable paints, or the presence of other flammable compounds, or heavy dust concentration creates a hazard.
36. When burning or welding, employees must wear approved eye protection with suitable filter lenses. If employees' eyes are exposed to flying objects from chipping slag or other weld-cleaning activity, employees must wear approved eye protection. When employees arc weld near other workers, all employees must be protected from the arc rays by non-combustible screens or adequate eye protection.
37. In the open air, when welding, cutting, heating, burning metals have toxic significance, (such as zinc, lead, cadmium, or chromium-bearing metals), a filter-type respirator must be worn.
38. Never weld or burn on barrels, tanks, piping, or other system which may have contained either combustible or unknown products without first properly purging and venting the container and obtaining approval from the appropriate Supervisor. The frames of all welding machines must be grounded.
39. All structural welding accomplished by the contractor on critical items such as scaffolding, shoring, forms, ladders, piling, etc., shall be performed by certified welders using qualified welding procedures.

### **7.24.3 HOT WORK CHECKLIST PROCEDURES**

1. The Contractor Safety Representative is responsible for inspecting each site and determining the need for a Hot Work Checklist.
2. A fire watch is required for every activity where hot work could possibly result in other than a minor fire due to ignition of combustibles.
3. Fire extinguishing equipment commensurate with the ignitable matrix and training level of the fire watch must be immediately available at the Hot Work location.

A combustible gas indicator (CGI) must be used to survey the Hot Work location and then must be left to constantly monitor the air between the flammable material and the immediate vicinity of the hot work when appropriate.

### **7.24.4 FUMES AND GASES**

Hazardous fumes and gases can be released into the air during welding and cutting. As seen in the table below, some of these are released regardless of the material being cut. Other depend on the type of metal or its coating. The two hazards which are considered most dangerous are cutting through lead-based paint and cutting in the presence of degreasers. Cutting materials which have been cleaned with a degreaser, or even in the vicinity of a degreasing operation can produce deadly phosgene gas. Mechanical removal such as sandblasting or chemical removal such as paint stripping may be necessary to remove hazardous coatings before cutting.

1. Adequate ventilation must be ensured before starting any cutting job.
2. Cutting in enclosed spaces, such as tanks, tunnels, or small, closed rooms, demands particular attention to worker safety. A hazardous situation can develop because oxygen can easily be replaced by gases or toxic fumes. If adequate mechanical ventilation cannot be provided, workers must be equipped with air supplied respirators and a lifeline which is constantly watched by an outside observer.
3. Cylinders must be kept outside the enclosed space and gases should be shut off at the cylinders when work stops for more than a few minutes.
4. A leaky hose or fitting in an enclosed space can easily result in an explosive or oxygen-deficient atmosphere.
5. Welding and cutting work on containers that have held combustible solids, liquids, gases or dusts can result in fire or explosion if the containers are not entirely free of these materials. It is important that a

rigorous cleaning process be undertaken and that instructions for cleaning be rigidly followed. Containers which have held any of the following materials are considered dangerous, and hot work should not be started before they are properly cleaned and tested.

<b>CHEMICALS THAT CAN RESULT IN COMBUSTIBLE AND/OR EXPLOSIVE ATMOSPHERES.</b>
Gasoline, kerosene, solvents, or light oil
Acids which react with metal and produce explosive hydrogen gas
Heavy oils, tars, or solids
Combustible solids
Residue from combustible metals such as magnesium

Any container which has held combustibles should be considered unsafe until proven otherwise by a qualified person. When in doubt, the container should be cold cut by mechanical means. An empty or partially full container is more dangerous than a full one as liquid burn; vapors explode.

<b>TOXIC FUMES AND GASES PRODUCED BY CUTTING TORCHES</b>	
<b>Source</b>	<b>Chemical Produced</b>
Cutting	Carbon Monoxide
Cutting and Welding	Ozone
Welding Rods	Fluorides
Acids	Hydrogen Gas
Chrome-coated fixtures	Chromates
Cadmium	Cadmium
Lead Pipe	Lead Oxide
Zinc	Zinc Oxide
Any material painted with lead-based paint	Lead Oxide
Any material which contained or was cleaned with degreasers	Hydrochloric Acid and/or Phosgene Gas



#### **7.24.5 GAS EQUIPMENT**

1. Keep all welding leads and burning hoses up off floors, walkways, and stairways or appropriately protect such leads and hoses.
2. Fuel gas and oxygen hose shall be easily distinguishable and shall not be interchangeable. Hoses shall be inspected at the beginning of each shift and be repaired or replaced if defective.
3. Do not use matches or cigarette lighters to light torches. Spark igniters must be used. Torches must not be used to light smoking materials. Employees must wear appropriate protective gloves.
4. When a crescent or special wrench is required to operate an acetylene cylinder valve, the wrench must be kept in position on the valve. Fittings must be forced.
5. General mechanical or local exhaust ventilation or airline respirators shall be provided as required, when welding, cooling or heating.
6. After removing the valve protection cap, the worker should stand to the side of the cylinder valve opening and "crack" the valve. "Cracking" refers to quickly opening and closing the valve to remove dust particles from the opening.
7. Cracking should not be done near other welders, cutters, or ignition sources.
8. The regulator must be attached according to the procedure outlined by the manufacturer.
9. Pressure regulators should be serviced and tested for accuracy on a regular basis.
10. Only regulators which are approved by either Factory Mutual or Underwriters Laboratories should be used.
11. Torch valves shall be closed and gas supply shut off whenever work is suspended.
12. The torch and hose shall be removed from confined spaces whenever work is suspended.

13. Only those torches and gas mixers approved by Factory Mutual or Underwriters Laboratories should be used. Torch valves and fittings should not be oiled or greased.
14. All oxy-acetylene or other fuel gas-oxygen combinations used in cutting or welding equipment shall have reverse-flow check valves between torch and regulator. Manifold systems shall have the reverse - flow valves installed at the manifold connections. All arrestors must be installed at the regulator of each cylinder.
15. Acetylene regulators shall not be adjusted to permit a discharge greater than 15 psig.
16. Oxygen regulators and fittings should never be oiled, greased, or cleaned with oily rags.
17. Connection of multiple sets of oxy-acetylene hoses to a single regulator on a single set of oxy-acetylene tanks may only be accomplished by installing a commercially available fitting approved by Compressed Gas Association (CGA) Standards and UL listed. The fitting shall be installed on the output side of the regulator and shall have a built-in shut-off valve and reverse-flow check valve on each branch.

#### **7.24.6 ELECTRIC ARC WELDINGS**

The hazards encountered in electric arc welding are similar to those encountered in gas cutting and welding except gas related hazards are replaced by electrical hazards. The dangers of flying sparks must be guarded against, particularly near floor and wall openings where other works or combustibles may be hidden from view. PPE requirements are identical except that arc welders are required to wear a welding helmet.

1. Arc welding operators must be shielded by screens or curtains to protect others working in the vicinity.
2. Switching equipment for shutting down the welding machine shall be provided on or near the welding machine.
3. The noncurrent carrying metal parts of electrically powered welding machines shall be grounded. Grounding circuits, other than by means of the structure, shall be checked to ensure that the circuit between the ground and the equipment to be grounded has resistance low enough to permit sufficient current to flow to cause the overcurrent device to interrupt the circuit.

4. Neither terminal of the welding generator shall be bonded to the frame of the welder.
5. When electrode holders are to be left unattended, the electrodes shall be removed and the holder shall be placed or protected so they cannot make electrical contact with employees or conducting objects.
6. Pipelines containing gases or flammable liquids or conduits carrying electrical conductors shall not be used for a ground return circuit.
7. The equipment shall be shut down when the leads are unattended.
8. Cables should be inspected regularly for damage. Damaged insulation, conductors, or connections should be repaired or replaced to achieve the conductivity and water-tightness of the original cable.
9. Cables with splices or repaired insulation within 10 feet of the holder shall not be used.
10. Cables should always be kept dry and free of oil and grease.
11. Lengths of cable produce heat when in use, so cables should be neatly uncoiled before using to prevent damage to the insulation.
12. When the distance from the machine to the work varies considerable, the cable can be broken into lengths using connectors intended for this purpose.
13. When work is at a distance from the welding unit, cables shall be supported overhead. When this is impractical, they should be laid on the ground and protected from damage or the likelihood of causing an accident.
14. When in use, cables should be kept away from other power supplies or high voltage conductors.
15. Welding supply cables shall not be placed near power supply cables or other high-tension wires.
16. Welding leads shall not be permitted to contact metal parts supporting suspended scaffolds.
17. Lug covers shall be installed to protect both the positive/negative connections from accidental contact.

18. To minimize the danger of electric shock, suitable guards must be placed so as to prevent persons from accidentally contacting live electric circuits.
19. Whenever the machine is moved, the welder leaves the equipment or the work is stopped for an appreciable length of time, the power supply shall be disconnected.
20. When an electrode holder is to be left unattended, the electrode shall be removed, and the holder positioned to prevent accidental electrical contact with persons or conductive objects.
21. Electrode holders must never be dipped in water for cooling purposes.
22. The welder shall protect himself from electrical contact with his work or other grounding structures at all times. This is particularly important when welder is in the prone or sitting positions when the potential for large area contacts is high.
23. The welder should never permit the live metal parts of an electrode or its holder to touch his bare skin or damp clothes. Cables that are draped over or wrapped around a worker's body can transmit dangerous amounts of current.
24. Circuits from welding machines used for other than welding tools shall be grounded.

#### **7.24.7 INERT-GAS METAL-ARC WELDING**

1. All arc welding and cutting cables shall be completely insulated and be capable of handling the maximum current requirements for the job. There shall be no repairs or splices within 100 feet of the electrode holder, except where splices are insulated equal to the insulation of the cable. Defective cable shall be repaired or replaced.
2. Chlorinated solvents shall be kept at least 200 feet, unless shielded, from the exposed arc. Surfaces prepared with chlorinated solvents shall be dry before welding is permitted on such surfaces.
3. Persons in the area not protected from the arc by screening shall be protected by filter lenses. When two or more welders are exposed to each other's arc, filter lens goggles shall be worn under welding helmets. Hand shields to protect the welders against flashes and radiant energy shall be used when either the helmet is lifted or the shield is removed.

4. Welders and other persons who are exposed to radiation shall be protected so that the skin is covered to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks, openings, and highly reflective surfaces.
5. When inert gas metal-arc welding is performed on stainless steel, persons shall be protected against dangerous concentrations of nitrogen dioxide by local exhaust ventilation or airline respirators.

## **8.0 EMERGENCY ACTION PLAN**

### **8.1 General**

(This is a generic plan. A site-specific plan will be available at your project.)

This Emergency Action Plan (EAP) is a guide to plan for potential site evacuation and highlight certain project emergencies. The specific topics of this plan must be addressed in the project specific evacuation procedure. Each project/facility procedure may vary. Ensure that you and your employees are aware of these procedures.

It may be necessary to evacuate the project site at any time of all Contractor employees, Engineer Team Members and visitors. Evacuation causes may include: earthquake, fire, explosions or potential explosion; severe storms, hurricane, or tornado warnings; fumes, gas; electrical failures; or structural failures. The history of such happenings reveal a saving of life and property when an evacuation plan is effectively used.

Project plans and procedures will provide for the designation of a control center with an alternate. The control center will be located at a focal point of telephone and/or radio and intercom communications.

### **8.2 Supervisory Control and Responsibilities**

1. In the event of an emergency, an alarm will be sounded by a supervisor from any Contractor or the Engineer to alert the on-site workforce of the need to evacuate the project site.
2. An assembly area will be designated by each Contractor and the Engineer Team Members. Each evacuation manager is responsible for informing his employees of the location of their assigned emergency assembly area. Every Contractor and each Team Member employee at the project has a responsibility during an emergency evacuation, even if it is simply proceeding promptly to their assembly area in an orderly manner and reporting to his or her supervisor.
3. Each Contractor's Project Manager shall act as the evacuation supervisor for his company. The Engineer will be the evacuation supervisor for the Engineer's Team Members. In an emergency situation, each evacuation manager shall immediately proceed to the assembly area assigned by the Construction Manager. Each Contractor will take a head count of his personnel in the assembly area and report to the Engineer who is present and who is missing.

4. The Engineer will maintain a list of outside emergency services such as ambulance, hospital, doctors, fire department, police and other as may be deemed necessary to be called for assistance.
5. The Engineer will notify the UDOT TEAM of any missing employees. The Engineer will notify the UDOT TEAM as to the nature of the emergency and arrange to keep the STATE regularly informed. Press releases must be channel through the UDOT TEAM; no independent releases are to be given.
6. The Engineer shall act as liaison between the evacuation supervisors for each Contractor and the Engineer Team Member.
7. Contractor supervisors responsible for mobile equipment shall determine whether the equipment shall remain where it is at the time of the emergency or be moved to a predetermined area. Each Contractor Project Manager shall make the final decisions on all equipment movement.
8. All Contractors and Engineer Team Member supervisors shall report to evacuation areas, then stand by for instructions. They shall expedite the search for any missing employees as directed.
9. All Contractors and Team Member supervisors shall make an accounting of their employees and report this to their respective managers. Names, employee numbers, and last known whereabouts of missing people shall be forwarded to the Engineer
10. Employees, upon hearing the evacuation signal, shall shut down all their equipment, stop smoking. Required personal protective equipment is to remain in use. Employees shall proceed quickly to their assigned assembly areas and shall remain there pending further instructions from their supervisor.

### **8.3 Facilities (Operating)**

#### **1. Alarms**

There will be a recognized signal via horn, whistle, siren, or public address system which is audible to all. If there are any areas where the alarm cannot be heard, this condition will be corrected, with special provision made for remote work areas.

## 2. Notices

Upon completion of the specific project area, emergency plan and procedure notices will be posted for the information of all project employees. An example of a notice is:

**EMERGENCY EVACUATION PROCEDURE:** When the emergency signal consisting of repeated three (3) long blasts of the job whistle is sounded, all employees will immediately cease work, secure all equipment, and proceed directly to the designated assembly area (parking lot, change house, or other appropriate area) and remain there until further instructions are assigned by your craft supervisor.

### **8.4 Assembly Areas**

1. Each employee must be assigned a definite location to which to proceed. The assembly areas will be located at strategic places, close enough to work areas for access, but far enough away from potential disaster areas to afford protection to personnel. Alternate areas will be considered in case of inclement weather and other possible conditions. Assembly areas will provide a definite destination for an orderly evacuation, allow for grouping so that instructions can easily be conveyed to all, and expedite the search for missing persons.
2. Procedures will be established for an orderly shutdown of work with the sounding of the emergency warning signal. Equipment will be secured; burning, heating, gas system, and other potentially hazardous devices will be turned off. Personnel shall then proceed to the designated emergency assembly area.
3. After employees have reached the assembly area, each Contractor and Engineer Supervisor should proceed immediately to account for their employees.
4. Employees will remain in the assembly area pending instructions from their employer. Management supervision should inform employees with respect to the type of emergency and plans for the resumption or suspension of work.

### **8.5 Training**

The Project's Emergency Action Plan (EAP) will be effective only if employees are aware of it. With infrequent use and employee turnover, it will be necessary to review this plan at least twice a year. The Engineer and all Contractors should include the EAP in their new employee orientation; it should be discussed in safety meetings.



## **8.6 Emergency Equipment**

### **8.6.1 Survey of Equipment**

The Engineer may include in the EAP a survey of needed emergency equipment. This emergency equipment may include: specialized rescue equipment, self-contained breathing apparatus, backup monitoring instrumentation, portable electrical generators, communications devices, flashlights, special clothing, emergency medical supplies and other needed materials to cope with a project emergency.

### **8.6.2 Location of Equipment**

Emergency equipment will be placed at predetermined locations by the Engineer. These locations will be selected to provide optimum emergency use.

## **8.7 Inclement Weather**

### **8.7.1 Thunderstorm Safety**

1. Heavy rain, hail, lighting, high winds, and tornadoes may accompany a thunderstorm. For these reasons a thunderstorm can be very destructive. Since thunderstorms are difficult to foresee, it is important that employees be educated in the safety precautions to take in the event of a thunderstorm.
2. Employees should seek shelter indoors during a thunderstorm when possible. When indoors, it is important employees avoid contact with electrical appliances, conductive surfaces and structures.
3. If employees are outdoors, they shall remain lower than the nearest highly conductive object. Lightning will strike the easiest source to ground, not necessarily the highest. Conductive objects such as trees, telephone poles, crane booms, and flag poles shall be avoided. A safe distance from a conductive object is twice the object's height. Lightning is a thunderstorm's worst killer.
4. Objects which may carry electric current from a remote thunderstorm should also be avoided. These objects would include telephone lines, pipe lines and fences. An employee shall not use electric tools outdoors if a thunderstorm is in the immediate area.

5. The rains accompanying a thunderstorm may create flooding conditions. National Weather Bureau advisories shall be monitored by project safety for flash flood warnings. Employees should be instructed to avoid flood plains, drainage ditches, and dried creek beds when a flash flood warning is issued.
6. Employees must take certain precautions while driving during a thunderstorm. When poor visibility is encountered, the driver shall stop the vehicle until visibility improves. When lightning is in the immediate area, the employee shall seek shelter indoors, or remain in the vehicle away from interior metal parts. When high winds or flooding accompany the thunderstorms, the employee shall seek an appropriate protected area.
7. Employees shall not be permitted to work on cranes during a thunderstorm. In order to prevent damage or injury, cranes shall be grounded. If the crane is located on a barge or other vessel the crane shall be adequately bonded. The crane's boom shall be lowered when winds exceed approximately 30 miles per hour. Barges and other vessels shall be secured to a stationary source.

## **8.8 Bomb Threats**

The purpose of this procedure is to provide guidance to all Team Member employees to plan an appropriate reaction to bomb threats.

1. There are three types of bomb threats, as follows:
  - a. *Actual Warning* - In which a bomb has been placed and a humanitarian notice is being given.
  - b. *Harassment* - In which the goal is to disrupt project operations and/or impose economic hardship. In cases of harassment the instigator may be a disgruntled former employee or one with political, economic or ideological beliefs different from those of the project or the UDOT.
  - c. *Hoax* - In which the instigator derives a sense of power from the confusion and excitement created. In other cases the motivation frequently is the desire for paid time off from work.
2. The receipt of a bomb threat at the project will require a quick assessment as to whether the threat is an actual warning, harassment or a hoax, and the appropriate call to action by construction management. This requires that advance provision be made for the immediate communication of any bomb threat to Team Members.

Upon reaching a decision after consideration and assessment, the prearranged procedure for the given situation is to be placed into action.

3. Organizational planning in anticipation of such an event is essential in handling bomb threats. In doing so, clear-cut levels of authority must be established. Only by using an established organization and procedure can bomb threats be handled with the minimum risk to persons and property.
4. The particular characteristics and conditions existing at each jobsite location will require that each area develop emergency procedures to meet the contingencies of the specific location. In some case only a slight modification will be needed to accommodate the various project site locations.

## **8.9 Preparation/Planning**

1. In order to determine which type of bomb threat applies and to afford the maximum protection for project employees and the project, it is essential that the Engineer proceed with an immediate assessment of all factors and determine whether or not to evacuate a portion or all of the construction site.
2. Accuracy and a quick decision, based on these considerations, will be dependent primarily upon the accuracy and extent of the information concerning the call and caller issuing the threat.
3. The person receiving the bomb threat call should know the details of the Bomb Threat Incident Report, using it as a guide to the conversation. (Please refer to Attachment 8-2).
4. The Engineer is the individual to whom the operator is to report the threat. A designee will be provided to assure that at least one key management official is available at the project; and order of precedence for notification will also be established.
5. A comprehensive employee education program should be established. Every employee should have an adequate overview of just what precautions the company is taking in the event a bomb threat is received. In making employees knowledgeable of the planned safeguards, a panic situation usually will not occur. Panic is one of the most contagious of all human emotions. It is caused by fear--mostly fear of the unknown. Before and during a bomb threat, employees will be notified of this occurrence.

6. Notification of necessary fire, ambulance, and law enforcement agencies may be required. In preparation of the project procedure, contact should be established with the FBI, police and fire departments and other local governmental agencies to determine the following:
  - a. Do fire or police departments have a bomb disposal unit?
  - b. Under what conditions is the unit available?
  - c. What is the telephone number for the unit?
  - d. How can you obtain the services of the bomb unit in the event of a threat?
  - e. Will the unit assist in the physical search of the site or will it only disarm or remove explosives?
7. Project will organize and train search units consisting of key supervisor personnel. To be proficient in searching personnel must be thoroughly familiar with the areas they are assigned to search. These units should be all volunteers and trained only in search techniques; they are prohibited from any attempt at neutralizing, removing, or otherwise having contact with the device. The removal and disarming of a bomb or suspicious object must be left to the professionals in explosive ordnance disposal.
8. It is of paramount importance that all inquiries by the news media be directed to UDOT's spokesperson. All other employees are to be instructed not to discuss the situation with outsiders, especially the news media. The purpose of this provision is to furnish the news media with accurate information and see that additional bomb threat calls are not precipitated by irresponsible statements from uninformed sources. Should it be determined that evacuation is warranted, the prearranged emergency warning system will be sounded and the project site evacuated in an orderly manner as described earlier in this section.

#### **8.10 Project Management - Evacuation Considerations**

1. The decision as to appropriate action should be based on the evaluation of the following items:
  - a. Is the caller specific as to time?
  - b. Is the caller specific as to location--particularly in a multiple building facility?

- c. Is the caller specific as to type of bomb?
  - d. Does the caller seem to express honest concern over possible injury to people?
  - e. Does the caller seem to be serious, sober and calling from a location other than one with a background noise that would be associated with a bar?
2. If (a) and (b) or (b) and either (c), (d) or (e) are affirmative, the indicated building(s)/structure(s) should be evacuated from at least 30 minutes before the stated time of the explosion (if given) until at least 30 minutes after that time. If time is not given, evacuation should be carried out for a period long enough for a search. If neither (a) nor (b) above is affirmative, evacuation is not recommended, but a discreet supervisory search should be carried out (such to be designated in advance). After any evacuation, re-entry should follow another supervisory search.

#### **8.11 Project Telephone Operator**

1. Keep the caller on the line as long as possible. Ask the caller to repeat the message. Record, as completely as possible, words spoken by the caller.
2. If the caller does not indicate the location of the bomb or the time of possible detonation, you should ask for this information.
3. Inform the caller that the building(s) are occupied and the detonation of a bomb could result in death or serious injury to many innocent people.
4. Pay particular attention to peculiar background noises such as motors running, background music, and any other notice which may give a clue as to where the call is being made.
5. Listen closely to the voice (male, female), voice quality (calm, excited), accents and speech impediments.
6. Immediately after the caller hangs up, report to the person(s) designated by management to receive such information. Then complete the Bomb Threat Incident Report and forward by messenger to the management individual designated to receive this report.

## **8.12 Power Outage**

If a severe power outage occurs, the project may have an emergency generator(s) and temporary lights available to place in areas at which lighting is critical.

Areas most likely to be adversely affected by a power outage, thereby creating a potential hazard to Project employees, will be identified in advance, and equipment and/or a procedure will be adopted to minimize the effect of this outage. Those work areas that cannot cope with a power outage shall discontinue operations until power is restored.

## **Attachment 8-1**

### **EMERGENCY ACTION PLAN (SUPPLEMENT)**

#### **Purpose**

This supplement will act as an outline to assist in the development of a site specific Emergency Action Plan (EAP).

#### **General**

The Emergency Action Plan (EAP) is a guide to plan for site evacuation (attached) and should be referenced in addition to this supplement.

#### **Site Specific Procedure**

This supplement will act as the site specific Emergency Action Plan for. This plan may further be supplemented by work conducted at an operating facility. \_\_\_\_\_ will act as the Team Leader in the event an evacuation of the project is necessary. If the \_\_\_\_\_ is not available he/she will designate either the assistant to act as the team leader. The Team Leader or his/her designee will determine if all or part of the project should be evacuated.

The Control Center for the Plan will be \_\_\_\_\_ located at \_\_\_\_\_. If this location must be evacuated, the alternate control location will be \_\_\_\_\_, radio designation \_\_\_\_\_, mobile phone \_\_\_\_\_. At the direction of the Team Leader, emergency services will be contacted and the evacuation alarm will be sounded.

#### **Alarms**

(Until alarms are installed, the Engineer will contact field personnel by radio to evacuate the site.) The alarm method selected is a \_\_\_\_\_ alarm. This alarm will be sounded in the following manner to evacuate the site \_\_\_\_\_. The alarm(s) are located (see maps). Only trained members of the on site construction management team may sound the alarm. However, personnel on site will be briefed on the alarms and testing of these alarms will be conducted periodically.

#### **Assembly Area(s)**

Once the alarm has been sounded to evacuate the site, all work will cease, equipment will be turned off, and cranes will be unloaded. All personnel will proceed to the nearest assembly area by using safest route (see maps). At the assembly area, each employee will go to the specific area established by your department supervisor or contractors project manager. The department supervisors and contractors project managers will then report to the Team Leader the status of their personnel. Personnel will be instructed not to leave the site until accounted for and only after being released by the Team Leader.

The Team Leader has designated \_\_\_\_\_ to report to the alternate evacuation location (see maps) to assemble and account for those personnel. This person will report to the Team Leader the number of personnel assembled at the alternate site. If personnel are missing, the Team Leader will advise emergency services responding to the site as to the status of these individuals.

At no time will anyone re-enter the evacuated area until the Team Leader has given the "all clear" signal or directed team members to effect a search for missing personnel. (note: a flag or wind sock will be erected to assist with determining wind direction, in event of hazardous air borne material present).

### **Team Members**

This unit will follow the direction of the Team Leader, each will have specific responsibilities as follows:

**Sound the alarm** \_\_\_\_\_. This person, at the direction of the Team Leader, will sound the alarm.

**Main site** entrance \_\_\_\_\_. This person will proceed to the main gate to stop any traffic from entering the site, stop personnel from leaving the site (unless so instructed), and direct emergency traffic. This member must stay in radio contact with the Team Leader.

**Control Center Leader** \_\_\_\_\_. This person will assist the Team Leader with telephones and radios.

**Assembly Area** \_\_\_\_\_. This person will conduct head counts of construction management personnel, accumulate numbers of personnel from the contractors, and maintain general control of the assembly area. Advise Team Leader of any conditions or situations in this area and numbers of reported missing personnel.

**Alternate Assembly Area** \_\_\_\_\_. This person will proceed (by the safest route) to the alternate assembly area. This person will take control of the area, take head count and report by radio to the Team Leader the number of personnel assembled at the alternate area.

The Team Leader will make a list of personnel reported, (Engineer and Contractors) verify that the personnel reported missing are not at one of the assembly areas.

### **Training**

This policy and procedure will be reviewed regularly. When, and if changes are made, training of all personnel will be conducted, and changes will be distributed to on-site contractors. Semi-annual training is required whether changes are made or not.

When new employees arrive on site, the Emergency Action Plan will be reviewed with these employees. If they have responsibility as a team member, their name will be posted with the Emergency Action Plan.

All visitors to the site will receive a brief orientation of this plan.

### **Emergency Phone Numbers:**

Emergency numbers will be posted near all telephones.



**Contractors' Responsibilities:**

1. Establish their own Emergency Action Plan designed to coordinate with this site plan.
2. Train all personnel and new hires and retrain semi-annually.
3. Establish areas of responsibilities and identify persons by name.
4. Immediately contact the Engineer of any event that may require his attention for evacuation.
5. Submit your Emergency Action Plan to Engineer.
6. Post the Emergency Action Plan in a place where employees can review it.
7. Assure that all cranes are unloaded and equipment is turned off.
8. Contractor will advise vendors and delivery personnel of this plan.

The Contractor is responsible for his employees and equipment for a safe, efficient evacuation. No high speed travel by any vehicles will be allowed. Vehicles must not endanger personnel

Note: Specific instruction for the following items are outlined in the general plan:

1. Bomb Threats
2. Power Outage
3. Project Managements Evacuation Considerations
4. Thunderstorms

**Attachment 8-2**

**BOMB THREAT INCIDENT REPORT**

Who received call: \_\_\_\_\_ Date: \_\_\_\_\_

Time (AM/PM): \_\_\_\_\_ Location call received: \_\_\_\_\_

Origin of call: Local \_\_\_\_\_ Long Distance \_\_\_\_\_ Booth \_\_\_\_\_ Internal \_\_\_\_\_

Time caller hung up: \_\_\_\_\_ (AM/PM)

THE CALLER: (Try to hold caller on line and get all information possible)

Time bomb will explode: \_\_\_\_\_ Kind of bomb: \_\_\_\_\_

What bomb looks like: \_\_\_\_\_

How it is activated: \_\_\_\_\_

Where it is located (building or area): \_\_\_\_\_

Reason for placing bomb: \_\_\_\_\_

Exact words of caller: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Caller's name (if given): \_\_\_\_\_ Male \_\_\_\_\_ Female \_\_\_\_\_

VOICE: Child \_\_\_\_\_ Adult \_\_\_\_\_ Approximate age: \_\_\_\_\_

## Attachment 8-2 (Cont)

### VOICE CHARACTERISTICS

Accent or dialect: Local: \_\_\_\_\_ Not Local: \_\_\_\_\_

Foreign: \_\_\_\_\_

Regional Characteristics: \_\_\_\_\_ (specify) Other: \_\_\_\_\_ (specify)

Tone: Loud: \_\_\_\_\_ Soft: \_\_\_\_\_ High Pitch: \_\_\_\_\_ Low Pitch: \_\_\_\_\_

Raspy: \_\_\_\_\_ Other: \_\_\_\_\_ Pleasant: \_\_\_\_\_ Rational: \_\_\_\_\_

Irrational: \_\_\_\_\_ Calm: \_\_\_\_\_ Angry: \_\_\_\_\_

Speech: Coherent: \_\_\_\_\_ Incoherent: \_\_\_\_\_ Righteous: \_\_\_\_\_ Emotional: \_\_\_\_\_

Laughing: \_\_\_\_\_ Fast: \_\_\_\_\_ Slow: \_\_\_\_\_ Distinct: \_\_\_\_\_ Distorted: \_\_\_\_\_

Stutter: \_\_\_\_\_ Nasal: \_\_\_\_\_

Language: Excellent: \_\_\_\_\_ Good: \_\_\_\_\_ Poor: \_\_\_\_\_ Cursing: \_\_\_\_\_

### BACKGROUND NOISE

Factory Machines: \_\_\_\_\_ Office Machines: \_\_\_\_\_ Bedlam: \_\_\_\_\_ Music: \_\_\_\_\_

Mixed: \_\_\_\_\_ Street Traffic: \_\_\_\_\_ Trains: \_\_\_\_\_ Animals: \_\_\_\_\_ Quiet: \_\_\_\_\_

Voices: \_\_\_\_\_ Airplanes: \_\_\_\_\_ Party Atmosphere: \_\_\_\_\_

SPECIAL NOTE: Did the caller appear familiar with Project locations by his or her description of the bomb location? Write out the message in its entirety and any other comments on a separate sheet of paper and attach to this checklist.

## **9.0 ENVIRONMENTAL CONSIDERATIONS**

### **9.1 General**

This section is established to provide general guidance and allow each Contractor to manage operations which have some degree of potential to cause environmental damage. This damage may result because of a ruptured fuel tank, improper storage of paints and solvents, improper handling of hazardous waste, e.g., asbestos, or some other accident that may foul the worksite(s) and/or the surrounding area.

### **9.2 Scope**

This procedure will apply to all Contractors operation to assure that hazardous materials associated with normal construction are managed, and environmental damage does not occur. If the Engineer observes non-compliance with the requirements of this section he/she will inform his/her supervisor. The supervisor will investigate this situation and prepare a safety deficiency report if needed and provide it to the Contractor and request correction be made. The Contractor is responsible with this section.

### **9.3 Contractors**

The on-site Contractors are responsible for the following requirements:

1. Follow existing procedures for the procurement, receipt, storage and handling of hazardous materials under their control.
2. Train their employees to control the identified waste and recyclable products in the containers provided.
3. Maintain Material Safety Data Sheets (MSDS) on file for their hazardous chemicals, as described in Section 9.16.
4. Determine the nature of the health hazard of hazardous materials removed from the project site. Store and dispose of the materials in accordance with federal, state and local regulations.

### **9.4 Supervision and Management**

Contractor supervision and management are responsible for the following:

1. Provide supervision to ensure that materials discussed in the section are not handled and disposed of in a manner contrary to the established procedure.

2. Ensure that employees follow all of the requirements incorporated within the MSDS.
3. Ensure that equipment for emergency action are in place to provide quick assistance and minimize employee risk.
4. Ensure that materials are stored and transported in accordance with federal, State, and local regulations from the warehouse or supply area to the waste container area.

## **9.5 Employees**

Employees are responsible for:

1. Labeling secondary containers and subsequent containers of chemicals.
2. Using chemicals in a manner consistent with the MSDS and the manufacturer's recommendations.
3. Using correct personal protective equipment in accordance with the hazard analysis, MSDS, or other procedural requirement.
4. Notifying supervision if they are in doubt as to the proper handling or management of hazardous materials.

## **9.6 Storage of Chemicals and Fuels**

Each Contractor shall provide the Engineer with a plan as to where all hazardous chemicals and fuels storage tanks and containers will be located. This plan will include all safety and health precautions to be implemented to maximize safe handling and storage of chemicals and fuels. This plan and the location requested by the Contractor must be approved by the Engineer prior to bringing chemicals and fuels onsite.

1. Flammable and Combustible Liquid Container: Only approved containers and portable tanks shall be used. Metal containers and portable tanks meeting the requirements of and containing products authorized by Chapter 1, Title 49, of the Code of Federal Regulations (DOT Regulations, NFPA Standard No. 30 and the local Uniform Fire Code (UFC).
2. Inside Storage Facilities on Site: Inside storage facilities must be designed and constructed in accordance with NFPA 30 - 1984 and the Uniform Fire Code (UFC).

3. Outside Storage for Containers Under 60 Gallons: The Contractor must contact the Engineer concerning new regulations or changes involving outside temporary flammable and combustible liquid storage facilities on site. A diagram of the containment method to be used shall be submitted to the Engineer and must be reviewed and accepted prior to material being brought on site. The Contractor planning or having an outside storage facility must obtain a SIG. The SIG refers to design criteria for outside storage facilities in accordance to NFPA Guidelines 1984, and the local Uniform Fire Code (UFC). The mentioned standards and codes must be used in the design of the outside flammable combustible liquids storage facility (containers under 60 gallons). A 10:ABC fire extinguisher must be located no more than 25 or less than 10 feet from the storage area.
4. Temporary Above Ground Fuel Storage Tanks in Excess of 60 Gallons: The Contractor must contact the (ENGINEER) when operations required to have on site a temporary above ground fuel storage tank in excess of 60 gallons.

## 9.7 Spill Control Definition and Control

1. Waste Disposal and Minor Spills: A minor spill is a condition that does not present potential harm to personnel and/or the environment, and the Contractor has the ability to immediately control and clean-up the spill and the spill is less than 25 gallons (quantity may be less based on toxicity refer to MSDS). Action to control non-emergency spills involve the following activities from the Contractor:
  - a. **Immediately** contact the Engineer and implement the Spill Notification Procedure (Appendix B).
  - b. Have on hand a trained individual to respond to critical events involving spills.
  - c. Have available contingency clean up equipment to handle non-emergency spills (absorbent materials, personal protection equipment, compatible empty container to store spilled material, fire extinguisher, etc.)
  - d. Spilled liquids or solids are to be properly contained in a compatible container and stored on-site until proper disposal action is taken at the time of the spill as required by State and Federal Requirements. When a spill occurs or when hazardous wastes are generated the Contractor will fill out a hazardous waste label and establish an accumulation date. The Contractor can maintain waste materials and non-emergency spills up to 55

gallons (approved container) no longer than 90 days from the accumulation start date.

Enclosed in Appendix B is a listing of hazardous waste haulers of which should be contacted well in advance to the 90 day accumulation expiration date. When the disposal company or hazardous waste hauler picks up the Contractor's waste materials, a Uniform Hazardous Waste Manifest must be obtained by the Contractor and the Construction Manager must receive a copy of the manifest.

- e. At the time of an accidental spill, the Contractor will also complete the "Emergency Release Follow Up Notice Reporting Form **prior to the contaminated material leaving the site**. The completed form must be submitted to the Engineer.
2. Emergency Spills: If the spill presents a potential for harm to personnel, public or the environment, the Contractor is not able to immediately control and clean-up the spill and/or the spill exceeds the reportable quantity (25 gallons or based on guidance from the Engineer), the Contractor or the Engineer will take the following action:
- a. Notify the Engineer and the UDOT Safety Risk Manager to determine if the quantity or severity of the spill warrants outside assistance by emergency services (again, this is to ascertain the toxicity, size of spill and if the spill could enter a sewer or storm drain line).
  - b. If the spill is clearly an emergency spill condition and the Engineer or the UDOT Safety Risk Manager requests outside assistance, notify the UDOT Hazardous Materials Emergency Response Team 911.

Notify the UDOT Hazardous Materials Management Program

- c. An incident report will be submitted within 24 hours to the Contracts Manager (ENGINEER). The UDOT Safety Risk Manager will review the report and if necessary hold a Post Incident Meeting with the Contractor.

The same procedure for hazardous waste removal under State and Federal Requirements Title 22 Section 66262.34 (a) and the completion of the Emergency Release Follow-Up Notice Reporting Form must also be finalized by the Contractor with copies to the ENGINEER.

## **9.8 Hazardous Waste and Documentation.**

Each Contractor is responsible for all required hazardous waste management which includes but is not limited to the transportation, storage and disposal at a hazardous waste disposal facility. The Engineer and the UDOT Safety Risk Manager will monitor all environmental issues at the job site. Non-compliance to spill containment controls will be communicated to the Contractors by the UDOT Safety Risk Manager for immediate corrective action.

The Contractor must obtain a licensed waste hauler to remove known wastes (liquids, solids) by referencing to the enclosed list of approved waste haulers (Appendix B). It is recommended that the Contractor use a State Certified Hazardous Materials Lab (Appendix B) when necessary to identify an unknown spill material. Identifying the type of spill material or liquid containment can save the Contractor from increase costs for disposal if the material to be removed is known.

## **9.9 Abrasive Sandblasting**

### **1. Purpose**

To establish minimum requirements for all Projects Contractors to perform outdoor abrasive sandblasting operations.

### **2. Scope**

This procedure applies in its entirety to all Projects unless a variance from its requirements is granted by the UDOT Safety Risk Manager.

### **3. Responsibilities**

The Contractor Shall:

- a. Prepare a Job Safety Analysis (JSA).
- b. Evaluate all safety and health exposures.
- c. Train effected employees.
- d. Post appropriate warning signs.
- e. Ensure overspray from blasting operations in does not affect the safety, health and well being of other contractor personnel.



#### 4. Definitions

- a. **Shall:** The word "shall" is to be understood as mandatory.
- b. **Abrasive Blasting:** The forcible application of an abrasive to a surface by pneumatic or hydraulic pressure, or by centrifugal force.
- c. **Particulate Filter Respirator:** A negative pressure air purifying respirator (APR) which removes dusts or fumes from air by filtration.
- d. **Supplied Air Respirator:** A device consisting of a face piece, helmet, or hood to which clean air is supplied to the wearer through a hose.
- e. **PEL:** - Permissible Exposure Limits.
- f. **CFR:** - Code of Federal Regulations.

#### 5. General Requirements

- a. All outdoor sandblasting operations must comply with all Federal, State and local regulations.
- b. Operators of abrasive blasting equipment shall be instructed in the proper use and maintenance of equipment.
- c. Respiratory equipment shall be selected, used, and maintained in accordance with OSHA requirements for Respiratory Protection.
- d. Field abrasive sandblasting operations shall require an isolated work area with warning signs and barricades. Significant dilution of the respirable dust generated at the sandblasting nozzle will occur almost instantaneously within approximately 2 feet of the nozzle (dependent upon wind, speed, nozzle pressure etc.). This dilution is caused primarily by the dissipation of the momentum of air coming out of the sandblasting nozzle through turbulent free jet mixing. Isolation will help ensure that neighboring work personnel are not exposed at or above the PEL.
- e. The abrasive blasting agent (e.g., sand) shall contain the lowest amount silica/quartz available, and must be certified by the UTAH Air Resource Board in accordance with any and all requirements.

- f. Abrasive materials shall not be permitted to accumulate. Accumulated dust shall be promptly removed.
- g. Blast cleaning nozzles shall be equipped with an operating valve which must be held open plainly and will shut off automatically when released by the operator (dead-man switch). A support shall be provided to mount the nozzle when not in use. All hoses shall be secured at each in line connection with tiewire and whipchecks.
- h. Only compressors designed specifically to supply breathing air shall be used to provide air to supplied-air respirators.
- i. All air compressor equipment shall be provided with high temperature alarms and similar warning devices to assure carbon monoxide (CO) is not introduced into the system.

Note: Carbon monoxide (CO) can be present in the system from a malfunctioning breathing air compressor or from poorly located air intakes.

- j. All filters on breathing air compressors shall be maintained in accordance with the manufacturers recommendations.
- k. Where air compressors are equipped with a receiver tank, the tank shall be in compliance with local pressure vessel requirements.
- l. When bottled compressed air is used as a source of breathing air, the air quality shall be Grade D, or better. Certification of air quality shall be obtained from the supplier prior to using compressed breathing air. Only compressed ambient air shall be used. Mixed or blended air is not acceptable and shall not be used.

## 6. Implementation

The following table summarizes the current PEL's for the different types of Crystalline Silica Dusts:

	SILICA TYPE	PEL/TLV
1.	Quartz	0.1 mg/m <sup>3</sup> , Respirable Dust
2.	Cristobalite	0.05 mg/m <sup>3</sup> , Respirable Dust
3.	Silica, Fuse	0.1 mg/m <sup>3</sup> , Respirable Dust
4.	Tridymite	0.05 mg/m <sup>3</sup> , Respirable Dust
5.	Tripoli	0.1 mg/m <sup>3</sup> , Respirable Quartz Dust

Contaminants from the surface coating of the object(s) being cleaned (such as lead, and cadmium) may be introduced into the breathing zone when sandblasting and should be evaluated. An industrial hygienist shall make an evaluation of these potential hazards and required protective controls when surface coatings are known, or suspected to contain hazardous components. Representative air samples taken by the contractor may be required to determine all potential air contaminants.

Such sampling results shall be submitted to the Engineer.

### a. **Permissible Exposure Limits:**

The Permissible Exposure Limit (PEL) for silica is based on the fraction of crystalline quartz in the respirable component (particle size less than 10 microns) the present Occupational Safety and Health (OSHA) PEL is 0.1 mg/m<sup>3</sup>.

### b. **Monitoring:**

- Indicators that an evaluation of employee exposure should be undertaken include:
  - Information or observation which would indicate employee exposure to silica, lead, cadmium, carbon monoxide or other substances.
  - Complaints of airborne silica, or other contaminants.

- Employee complaints of symptoms which may be attributable to exposure to silica or other substances, such as lead, cadmium, carbon monoxide.
- Production, process, or control changes which may result in an increase in the airborne concentration of silica, or whenever there is any reason to suspect an increase in the airborne concentration of silica.
- Employee exposure monitoring shall be performed according to the procedures published in the OSHA Technical Manual, Chapter 1, or under a sampling program established by a qualified Industrial Hygienist. The recommended standard method for determination of respirable silica exposure is collecting breathing zone samples with a 10-mm nylon cyclone to separate the larger non-respirable fraction, followed by the collection of the respirable material on a 37-mm membrane filter. The membrane filter material can be analyzed for crystalline silica by infrared (IR), X-Ray diffraction (XRP), or spectrophotometric means.

Additional sampling and analysis may need to be performed for substances other than silica such as lead, cadmium and carbon monoxide.

**c. Training:**

- Each employee who may potentially be exposed to silica, or any other hazardous substances, shall be informed at the beginning of his or her assignment to such an exposure area of the hazards, relevant symptoms, appropriate emergency procedures, and proper conditions and precautions for safe use or exposure. This indoctrination process shall be documented prior to the start of work. Copies of such indoctrination shall be made available to the Engineer upon request.
- Affected employees shall be instructed to advise the company of the development of any signs and symptoms of prolonged exposure to silica and other hazardous substances. (e.g., lead, cadmium, carbon monoxide).
- All employees shall be informed of the specific nature of operations which could result in exposure to silica or other substances (e.g., lead, cadmium, carbon monoxide) above

the permissible limits, as well as of the safe work practices for the handling, use, or release of silica (or other applicable hazardous substances).

- Employees shall be informed of the types and functions of Engineering controls.
- Employees shall be instructed in proper housekeeping practices in accordance with 29 CFR 1910.22 (a), 1910.141 (a)(3), 1910.106 (e)(9), 1910.176 (r), 1910.25, and all other applicable Federal, State and Local regulations.
- Employees shall be instructed as to the purpose, proper use, and limitations of respirator in accordance with 29 CFR 1910.134 and ANSI 88.2 Practices for Respirator Protection.
- Employees shall be informed where written procedures and health information are available for their review on the premises. Employees shall be advised of the increased risk of impaired health due to the combination of smoking and silica dust exposure.

d. **Engineering Controls:**

- Moisture, mists, fogs, etc., should be added where such addition can substantially reduce the exposure to airborne respirable silica dust.
- Adequate measures shall be taken to ensure that any ambient particulate discharges will not produce health hazards to others working adjacent to the blasting operations. All operations shall be in compliance with applicable local, state and federal clean air standards.
- When mobile equipment is operated in areas of potential contaminant exposure, Engineering controls shall be provided to protect the operator from such exposure.

e. **Personal Protective Equipment:**

Engineering controls shall be used to maintain silica dust exposure (as well as any other potential contaminant exposure) below the PEL. When this limit cannot be met by engineering and administrative controls, then a program of personal protection including a Respiratory Protection Program shall be used to protect all potentially exposed employees.

- **Respirator Selection and Usage:**

- All employees using negative air respirators shall be evaluated by a physician to determine the ability of the worker to wear a respirator.
  - Respirators specified for use in higher concentration of airborne silica may be used in atmospheres of lower concentrations.
  - All personnel involved in the operation of the sandblasting equipment shall wear Type C, continuous flow, supplied-air, positive pressure, demand type respirators with hood or helmet. All personnel not directly involved in the operation must be restricted from the area, appropriate barriers, signage and demarcation shall be used. Note: Pot tender exposure must be evaluated before appropriate respirator protection can be chosen.
  - An appropriate respirator shall be selected from the following table and provided to employees:
- The blasters shall wear in addition to Type C continuous flow, supplied air respirator with hood as helmet, heavy canvas or leather gloves and aprons (or equivalent protection) to protect them from the impact of abrasive.
  - Safety shoes are recommended to protect against foot injury.
  - Adequate hearing protection shall also be utilized in accordance with 29 CFR 1910.95 (c), 29 CFR 1926.101.

**Recommendations for Respirator Usage at Airborne Silica Concentrations  
Above the Permissible Exposure Limit (PEL)**

<b>Airborne Silica Concentration</b>	<b>Respirator Type*</b>
Less than or equal to 10x the PEL	Half mask respirator with replacement high efficiency particular air filter (HEPA).  Type C, supplied-air respirator, demand type (negative pressure), with full face piece.
Less than or equal to 100x the PEL	Full face piece respirator with replaceable HEPA filter.  Type C, supplied-air respirator, demand type (negative pressure), with full face piece.
Less than or equal to 3000x the PEL	Powered air-purifying (positive pressure) respirator, with replaceable (HEPA) filter.
Greater than 3000x the PEL	Type C, supplied-air respirator, continuous flow type (positive pressure), with full face piece, hood, or helmet.

- \* Only Type C supplied-air positive pressure, demand type respirators with full face piece, hood or helmet shall be used by the blaster. It may be necessary depending upon ambient concentrations of contaminants. Without quantification of airborne contaminants Type C, supplied-air, continuous flow type respirators shall be used. Such protection must also be necessary for all adjacent personnel in the immediate vicinity or blasting operations. Depending upon the ambient concentration of contaminants.

**f. Personal Hygiene Facilities and Practices:**

All food, beverages, tobacco products, non-food chewing products, and unapplied cosmetics are prohibited in blasting work areas. See section (g) below for additional housekeeping practices.

g. **Housekeeping:**

- All employees shall be instructed in proper housekeeping practices in accordance with 29 CFR 1910.22 (a), 1910.141 (a)(3), 1910.106 (e)(9), 1910.176 (r), 1910.25.
- All exposed surfaces shall be maintained free of accumulations of silica dust, and other contaminants which, if dispersed, would result in airborne concentrations in excess of their PEL.
- Dry sweeping and the use of compressed air for the cleaning surfaces contaminated with blasting residue is prohibited.
- If vacuuming is used, the exhaust air shall be properly filtered to prevent generation of airborne respirable silica and other contaminants.
- Gentle wash down of surfaces is preferable.
- Emphasis should be placed on preventive maintenance and repair of equipment, proper storage of dust producing materials, and collection of dusts containing silica, and other contaminants.

h. **On-Site Work Areas:**

- If abrasive blasting is performed without an enclosure, adequate respiratory protection shall be provided for all employees in the area. Portable engineering control devices should be used at the location to collect all the used abrasive agents as it is applied when feasible.
- If wet blasting is employed, airborne dust hazards will still exist after the evaporation of water. Contingencies shall be made to address such situations.
- When airborne abrasive blasting dust becomes sufficiently heavy in an area to cause a temporary safety hazard by reduced visibility, or a marked discomfort to the unprotected employees not engaged in abrasive blasting, such operations in the affected area shall be discontinued until the airborne dust has been removed from the horizontal surfaces in the area. If such operations must continue, appropriate respiratory equipment shall be provided to those



employees remaining in the area, providing viability is adequate.

i. **Confined Space:**

- A confined space is a compartment, tank or similarly enclosed space in which abrasive blasting, or a pre-existing atmosphere, may cause the employee to be overcome by conditions hazardous to life and where egress may be difficult if normal body functions are impaired. Confined spaces can subject personnel to the accumulation of toxic or flammable contaminants, contain physical hazards, or have an oxygen deficient atmosphere.
- Confined spaces include but are not limited to, the following: Storage tents, underground utility vaults, sewers tunnels, pipelines and open top spaces more than 4 feet in depth such as pits, excavations vaults and vessels.
- Individuals working within confined spaces shall comply all applicable Confined Space Entry (CSE) regulations

j. **Confined Space Blasting Procedures:**

- All access hatches, trap doors, etc., should be opened before work is started to aid natural ventilation.
- Mechanical ventilation should be used, picking up air at the furthest point away from the opening if natural ventilation will not cause a complete air change per minute.
- The other potentially hazardous materials present, such as solvents, crusts of chemicals, or old paint, shall be considered with regard to explosion or fire potential when blasted.
- A "buddy system" shall be used for each employee inside a confined space, and another employee shall be available to assist in a potential emergency.
- A self-contained breathing apparatus (SCBA) or air-supplied hood shall be utilized for respiratory protection when necessary.
- Adequate lighting that meets the requirements of the National Electrical Code (NEC), Article 502, shall be utilized.

- If the space is mechanically ventilated, means should be provided to collect dust before release to the open atmosphere.

k. **Records**

Employee exposure records created as a result of this procedure shall be retained for the duration of the employee's employment, plus thirty years. Copies of all records shall be submitted to the Engineer and UDOT Safety Risk Manager upon request

## **10.0 FIRE PROTECTION AND PREVENTION**

### **10.1 General**

An uncontrolled fire can be devastating to the Project and could pose a serious threat to the employees working here. All personnel must do their part to assure that a fire emergency does not occur.

### **10.2 Housekeeping**

All personnel must follow good housekeeping practices. If anyone observes an undue large amount of: paper, scrap lumber, rags, oil, grease, solvents or other waste products, that could easily create a large fire from the hazards of day-to-day operations, that person must report this condition(s) the Contractor responsible for the area or the UDOT Safety Risk Manager.

### **10.3 Fire Fighting Equipment**

Personnel must assure themselves that they are knowledgeable with the location and use of portable fire fighting equipment.

Type ABC extinguishers must be located within 50 feet of each and every work or storage area.

A check should be made monthly to assure that portable fire fighting equipment is free of defects and available for prompt use, not blocked by equipment and/or materials.

### **10.4 Fire Emergency Telephone Number**

The fire emergency telephone is "911". This number is posted at the Project field buildings and must remain posted and conspicuous during the life of the Project.

### **10.5 Fire Fighting Agency Action**

The Engineer or designee should contact the local fire fighting agency and advise them of the Projects location.

During the course of construction, the Engineer should ask the local agency to revisit the Project. This revisit will allow fire fighting personnel to remain cognizant of the stage of construction and to review the various routes of entry to the Project in the event of a fire emergency.

Project roads must remain open and available for fire emergency vehicle traffic. The Engineer will be notified in the event operations or equipment blocks the road(s) to outside emergency vehicles.

#### **10.6 Liquefied Petroleum Gas (LPG)**

If the Engineer or the Contractor uses LPG at the Project site, storage tanks will be located with due consideration for adjacent Project building, operations and property boundaries.

The LPG vendor must be advised of conditions which might pose a hazard to the safe storage of LPG tanks.

National Fire Protection Association (NFPA) No. 51 should be reviewed in detail as a guide information document for placement of this equipment.

## 11.0 LEAD PROTECTION

As an employer we are committed to providing all employees with an injury free work environment. We must therefore recognize and manage health hazards associated with lead exposure at each project.

The following guidelines represent UDOT's program for minimizing employee exposure to lead:

### 11.1 IDENTIFYING/SAMPLING FOR LEAD HAZARDS

UDOT may be exposing its employees to lead hazards when work involves activities like **CUTTING, BURNING, GRINDING, REMOVAL, SCRAPING COATED MATERIALS and HOUSEKEEPING (SWEEPING)**. **BEFORE** any activity begins, projects must take measures to identify the presence of LEAD on painted surfaces.

1. Use existing test documentation from the owner to see if lead is present on the painted surface.
2. Test the coated area with a Lead Check (Trade Name), or equivalent, to see whether or not lead is present. This is a quick test for lead and shall not be used alone in determining if lead is present unless results are positive.
3. Take a representative sample of the coated material and test for **LEAD AND PCB's** (also cadmium if suspected). Contact the UDOT Safety/Risk Managers with any questions about sampling.
4. Test soil and sediment samples around the work area as required or necessary to establish a base line to verify a known or suspected presence of lead or other contamination.

### 11.2 PLANNING FOR LEAD EXPOSURE

Managing a lead hazard means the project must plan for the potential employee health and environmental impacts before the work begins. Each lead activity must be addressed in a job-specific activity plan with a primary focus on eliminating/minimizing the lead exposure. Each activity plan must address employee medical surveillance, personal protection, safe hygiene practices/controls, environmental controls, engineering controls, work practice controls, training, lead waste disposal and the identification of a competent person.

### **11.3 ESTABLISHING JOB SPECIFIC WRITTEN LEAD PROGRAM**

Establish and implement a job specific written lead protection program incorporating this policy and completing the activity plan lead section including:

1. A description of each activity in which exposure to lead is expected; e.g. equipment used, material involved, controls in place, crew size, employee job responsibilities, operating procedures, maintenance practices and a competent person.
2. A description of the specific means that will be employed to achieve compliance and, where engineering and work practice controls are required to reduce exposure levels below the PEL, document plans and studies used to determine methods selected for controlling exposure to lead.
3. A description of the technology considered in attempting to reduce the exposure levels below the PEL when feasible (ventilation, filtering, respirators, containment). Document reasons why some controls available are not feasible or possible to do.
4. Monitoring data that documents the source of lead emissions.
5. A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.
6. Provide written notification to vendors and subcontractors (i.e., salvage dealers) when materials containing lead base paint coatings are sold/given to them.
7. A work practice program that includes protective work clothing and equipment, housekeeping and hygiene facilities/practices and incorporates other relevant employee work practices.
8. Provide, when feasible, administrative controls schedule for employees minimizing the time spent working in lead area.
9. Hazard and solution identification documented in the activity plan(s) and conveyed to all employees working in the lead control area(s).
10. Regular and frequent inspections by the competent person.
11. Method of informing other contractors and subcontractors of potential lead exposure if applicable.

### **11.3.1 Lead Training**

Before any activity involving potential lead contamination and exposure begins, UDOT employees must receive job-specific training in the following areas: (Normally, the Region Safety/Risk Manager would conduct training.)

1. Review activity plan in regards to lead exposure/handling and hazards/solutions.
2. Specific activities that could result in exposure to lead and lead exposure levels (if known) for the work activities.
3. Health hazards associated with lead exposure.
4. Proper use, wear, care, and maintenance of protective clothing and equipment including respirators.
5. Engineering/administrative work practice controls needed to minimize lead hazards.
6. Purpose of medical surveillance and employee rights concerning this information. Discuss requirements concerning warning signs.
7. Review content and appendices of OSHA Occupational Safety and Health Standards, (section 1926.62 Lead).
8. Proper handling of lead contaminated materials and waste.
9. No chelating agents to be used except under direction of a licensed physician.
10. Employee rights to access exposure and medical records (CFR 1910.20).
  - a. Explain existence and location of records.
  - b. Person responsible to maintain and provide access to records.

### **11.3.2 Eliminating/Minimizing Exposure**

1. The first step in lead activity is determining whether the hazard can be eliminated or encapsulated. If feasible, can the lead coating be removed before working on the surface (blasting coating off-site, chemical stripping, etc.)?
2. If a hazard cannot be eliminated, the next step is to minimize it. This can be done through engineering, administrative and work practice controls such as work isolation, job rotation, mechanical ventilation, increased torch length,

and alternative removal methods. If administrative controls are used, (i.e. job rotation), a log of the rotating employees (name, SS#, duration/exposure levels/activity, etc.) must be kept on site and with the activity plans.

3. REMEMBER, if the hazard cannot be **eliminated** and the levels exceed the PEL (50 ug/m<sup>3</sup>), the lead work area must be clearly marked and posted with signs. UDOT recommends posting signs for all lead work areas reading:

**“WARNING  
LEAD WORK AREA  
POISON  
NO SMOKING OR EATING”**

### **11.3.3 Exposure Assessment and Air Monitoring**

1. Supervisors working with lead coatings must plan and develop safeguards to protect against exposures resulting from outside elements (wind, temperature) and work location (indoors, outdoors, over water, over workers, near public areas, etc.). Containment plans, should they be needed, must be project-specific and meet the needs of the people in the work area. The Region Safety/Risk Manager is available to help develop containment plans if deemed necessary by the competent person.
2. Each work activity (burning, welding, rivet busting, scraping, etc.) must be monitored to determine the levels of employee lead dust/fume exposure and the effectiveness of engineering controls, work practice controls, PPE, etc. Air monitoring must be done during an employee's regular daily duties. Initial air sampling should be taken as soon as possible with the start of an activity (within 24 hours, if possible) and the results received from the lab as soon as possible (within 48 hours, if possible). Respiratory protection must be determined by the airborne lead level results and the specific work activity. Compare results to the PEL. (Remember to adjust action limit and PEL if working other than 8-hr shifts.)
3. Continue air monitoring until two consecutive tests are obtained below the action level. A historical sampling result may be used as one of the two tests at least 7 days apart if the following conditions are met: acceptable historical air monitoring results are current within the last 12 months and taken where workplace conditions closely resemble the current work (essentially the same types of materials, tools, engineering and work practices, and environmental conditions).
4. In performing air monitoring (personal air sampling), documentation needs to be specific/detailed as to actual work activity tasks, time exposed to lead or non-lead work for the full shift, etc.



5. Any changes in the work activities or conditions that could possibly result in increased exposure require immediate further air monitoring.
6. Air monitoring needs to be done to represent each group of people who have similar exposures (for each task, location, work method, etc.).
7. Environmental Air Monitoring
  - a. Perform Total Suspended Particulate (TSP) monitoring when appropriate. (Usually on large outside jobs or jobs that vent outside.) Contact the Safety Department to coordinate any TSP monitoring that is required. Follow the environmental guidebook to establish and set up TSP monitoring.
  - b. Perform air monitoring prior to any lead abatement work.
  - c. Perform air monitoring during lead abatement activity.
  - d. Use trained individuals to perform this monitoring.
  - e. Document the sampling.

Note: Proper positioning of these instruments is important. TSP monitoring data will help document that UDOT is not polluting the environment or violating the state and/or federal Clean Air Act requirements.

The allowable limit is 1.5 ug/m<sup>3</sup> as a 90-day average. To adjust this limit to a daily average use the following formula:

$$DA = (90 \div PD) \times 1.5 \text{ ug/m}^3$$

DA=Daily Allowance for 24 hour period

PD=Number of days lead work will be performed in 90 day period

THEN

$$ADA = DA(24 \div H)$$

ADA=Adjusted Daily Allowance (ug/m<sup>3</sup>)

DA=Daily Allowance (ug/m<sup>3</sup>)

H=Hours worked in 24 hours

#### **11.3.4 Personal Protective Equipment**

After engineering and work practice controls are in place to minimize the lead contamination hazard, protective clothing must be utilized. At a minimum, this shall include gloves, coveralls or TyVek suits, boots, and hard hats. Clean protective coveralls or TyVek suits must be provided daily, if the airborne lead level is above 200 ug/m<sup>3</sup> and weekly if the airborne lead level is below 200ug/m<sup>3</sup>. However, TyVek suits

must be repaired or replaced immediately if ripped or torn. Respiratory protection will be determined/selected in accordance with the Respiratory Selection Guide Chart. PAPR's must be made available to employees should they request them provided known exposure limits for PAPR use are not exceeded.

### **11.3.5 Hygiene Practices and Controls**

Lead contamination occurs through ingestion, inhalation, and absorption. This usually results from ingesting lead particles that come in contact with food, coffee, and cigarettes, or through inhaling paint dust/fumes (without the benefit of a respirator), or coming into skin contact with lead containing materials for excessive periods of time. Good hygiene practices are extremely important no matter which type of lead activity is performed. Adequate time must be allowed for good hygiene practices so as not to interfere with employee break, lunch and shift completion times. To avoid any employee or environmental contamination, the following hygiene practices will be used on all projects with lead activity:

1. Running water (heated if possible), soap (pumpable preferred since it prevents contamination of soap), clean towels, and readily available trash container to ensure employees wash their hands and face prior to eating, drinking, smoking, and leaving the project. Showers are also required, where feasible, when the airborne lead is above 50 ug/m<sup>3</sup> (PEL) for an 8 hour (TWA) shift; 40 ug/m<sup>3</sup> for a 10 hour (TWA) shift; 33.3 ug/m<sup>3</sup> for a 12 hour (TWA) shift.
2. Clean change room/area for removing necessary street clothes and putting on protective clothing. Instructional signs should be posted in change and wash areas to ensure proper steps are taken to prevent exposures. Separate change room/area, including closed disposal container, for employees to remove contaminated clothing. Contamination must not spread to street clothes, employee homes and children.
3. Establish check point(s) at access/egress point(s) to lead work area(s). Assign an individual at this check point(s) to monitor employee hygiene practices exiting work area(s).
4. All dirty coveralls must be placed into a separate container. This container must be marked:

Caution: "Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead contaminated wash water in accordance with local, state and federal regulations."

5. Laundry cleaning service must be notified in writing that clothing is contaminated with lead.

6. Provide clean lunch/break room, separate from change area. Employees must HEPA vacuum themselves off at a checkpoint when leaving the lead work area or remove contaminated clothing and in either case, wash hands and face before entering a clean area.
7. Keep surfaces clean and work areas free from lead contamination, preferably cleaned with a vacuum equipped with High Efficiency Particulate Air (HEPA) filter. The clean areas (change room/area, lunch room/area, etc.) must have less than 200 mg/ft<sup>2</sup> of lead contamination (wipe test). Wipe samples should be done approximately every two weeks, more often if there is reason to believe the areas are not staying clean.
8. Equipment being removed from a lead controlled area needs to be decontaminated by vacuum or water wash. (i.e. body harness/lanyards, grinders, cords, hoses, small tools, etc.)

Caution: Do not use cleaning methods that introduce lead contaminated dust into the air (like dry sweeping, blow down, etc.).

Note: There will be no smoking, eating, or drinking in lead contaminated work/change areas, only in properly designated areas. There will also be no smoking, eating, and drinking until contaminated outer clothing is removed and employees have washed up. Furthermore, smoking and eating/drinking materials are not allowed in the lead area.

9. For additional information regarding Lead Abatement trailer use consult the Lead Abatement Trailer Use Procedures (pg. 11-36).

#### **11.3.6 Employee Lead Medical Surveillance**

1. Employees who will be participating in activities constituting a potential exposure to lead will undergo blood lead/ZPP testing as follows:
  - a. Blood lead/ZPP testing will be performed initially (one time) for new employees. Employees new to the lead medical surveillance program who are expected to be exposed to lead above the action level more than 30 days in a 12 month period will additionally be blood lead tested every two months for the first 6 months.
  - b. Employees will be retested annually when expected to be exposed to low exposure lead activities (<30 ug/m<sup>3</sup>).

- c. If employees currently monitored under this medical surveillance program are exposed to documented high risk/high exposure activities ( $>30 \text{ ug/m}^3$ ), the frequency of blood lead testing will increase to every 6 months for the period of exposure. Employee must be current with his/her blood lead test within 6 months or a new blood lead test must be offered to the employee.
- d. UDOT requires increased frequency of biological monitoring if the PEL ( $50 \text{ ug/m}^3$ ) is met or exceeded. **Should exposure monitoring equal or exceed the PEL, contact Corporate Safety immediately for assistance in engineering/workplace controls to reduce the hazard and to establish frequency of blood lead/ZPP testing requirements.**

## 2. Blood Lead/ZPP Testing

- a. Review UDOT's Blood Lead Historical Report and ensure that employees expected to work in the lead area are current within one year, have a blood lead  $<40 \text{ ug/dl}$  or are current within six months for high risk/high exposure activities with expected or known air monitoring results  $>30 \text{ ug/m}^3$  for the new lead work activities.
- b. If employees are not current with blood lead/ZPP testing an appointment should be scheduled through the Region Safety/Risk Manager.
- c. Blood lead levels at or above  $30 \text{ ug/dl}$  (UDOT's administrative limit)
  - If blood lead level is at or above  $\text{ug/dl}$ , a First Report of Incident must be completed and the cause investigated by the competent person and project management.
- d. Blood lead levels at or above  **$40 \text{ ug/dl}$  but below  $50 \text{ ug/dl}$** 
  - If a blood lead level is at  **$40 \text{ ug/dl}$  but below  $50 \text{ ug/dl}$** , blood lead testing must be done every month until two consecutive blood lead tests indicate levels below  $40 \text{ ug/dl}$ .
  - Removal from the lead environment until levels drop below  $40 \text{ ug/dl}$  and notify your regional safety superintendent/human resources manager.
  - Employees with blood lead level at or above  **$40 \text{ ug/dl}$  but below  $50 \text{ ug/dl}$**  must be offered a complete medical exam. If the employee declines, then the Medical Exam Decline Form, (see

Appendix R), must be completed by each employee declining such an exam.

- Complete First Report of Incident and coach individual on personal hygiene and check respirator fit. Consider using a higher level of respiratory protection.

e. **Blood Levels at or Above 50 ug/dl**

- If a blood lead level is **at or above 50 ug/dl**, another blood lead test must be done within 2 weeks of receiving the results from the first blood lead sampling with levels over 50 ug/dl and then monthly until two consecutive samples indicate levels below 40 ug/dl.
- Removal from the lead environment until levels drop below 40 ug/dl.
- A blood lead level **at or above 50 ug/dl** is an OSHA Recordable Illness.
- Complete a First Report of Incident Form and coach individual on personal hygiene and check respirator fit. Consider using a higher level of respiratory protection when go back into the lead work area.
- Record incident on the OSHA 200 log.
- Employee will be required to have a complete medical exam. At this point the exam is mandatory. (Can't go back to a lead environment without it.)

### **11.3.7 Medical Exams**

The initial medical exam, when required, is done by a physician chosen by the employer. A second opinion, (see below), may be requested by the employee using a physician chosen by the employee.

Employees may request a medical exam if any one of the following holds true:

1. Employee has developed signs or symptoms commonly associated with lead intoxication.
2. Employee desires medical advice concerning the effects of current or past exposure to lead on his/her ability to have a healthy child. (Includes effects on pregnancy and male fertility.)

3. Employee has a blood lead level at or above 40 ug/dl at any time during the preceding 12 months.
4. Employee is pregnant and is or has worked in a lead environment within the last 12 months.
5. Employee has difficulty breathing with a respirator.
6. Employee is requesting a second opinion. See requirement H.3 below.

#### **11.3.8 Content of Medical Exam (see Appendix R)**

1. Give two copies of this attachment to the employee before they go for their medical exam.
2. Instruct them to give a copy to the examining physician.
3. An employee has the right to request a second opinion after each occasion that an initial complete medical exam was given if the following is done by the employee:
  - a. The employee notifies UDOT of the desire for a second opinion within 15 days after receipt of the results of the initial medical exam.
  - b. The employee initiates steps to make an appointment with a second physician.

#### **11.3.9 Chelating Agents**

1. Prophylactic chelation (used to keep blood lead levels from getting higher) even if physician prescribed is not allowed at any time.
2. Therapeutic or diagnostic chelation may be prescribed by a licensed physician and performed under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring. Employees will be notified in writing prior to any chelation therapy.

This type of therapy is only prescribed when severely high levels of lead are in the body. This treatment is similar to chemotherapy for the treatment of cancer. It can be painful depending upon the individual's tolerance to pain.

### **11.3.10 Recordkeeping**

UDOT shall maintain accurate records of all monitoring and other data used in conducting employee exposure assessments. Copies of all these records must be sent to the Region Safety/Risk Manager. These records must be maintained for 30 years past the date of termination of the employee.

1. Exposure Monitoring Records
  - a. The date(s), numbers, duration, location and results of each of the samples including a description of the sampling procedure used to determine representative employee exposure.
  - b. A description of the sampling and analytical methods used and evidence of their accuracy.
  - c. The type of respiratory protective devices worn.
  - d. The name, social security number, and job classification of the employee(s) monitored.
  - e. The environmental variables that could affect the measurement of employee exposure.
2. Medical Surveillance Records
  - a. The name, social security number, and description of the duties of the employee.
  - b. A copy of the physician's written opinion.
  - c. Results of any airborne exposure monitoring done on or for that employee and provided to the physician.
  - d. Any employee medical complaints related to exposure to lead.
3. Medical Removal Records
  - a. The name and social security number of the employee.
  - b. The date of each occasion that the employee was removed from current exposure to lead as well as the corresponding date on which the employee was returned to his or her former job status.
  - c. A statement with respect to each removal indicating whether or not the reason for the removal was an elevated blood lead level.

4. Availability of Records

- a. UDOT will make available upon written request from the affected employee(s), former employee(s), their designated representatives and the Assistant Secretary and Director all records listed above for examination and copying.
- b. The following medical records shall be kept by UDOT's Safety/Risk Managers:
  - A copy of the medical examination results including medical and work history.
  - A copy of the letter sent to the employee's home with the results of the biological monitoring

5. Training Records

- a. Copies of all lead training rosters must be copied and sent to the UDOT Safety/Risk Managers.

6. Activity Plans

- a. Complete UDOT Lead Activity Plan prior to performing any lead activity. This shall be done for any job involving lead work.

**11.3.11 Lead Waste Disposal**

1. Treat all lead-contaminated waste as "hazardous waste". The Safety/Risk Managers in conjunction with Project Management, will dispose of it through one of UDOT's approved hazardous waste disposal companies.
2. Store all lead waste in DOT approved containers (15, 30, or 55 gal.). Proper storage and handling, daily inspections, and shipping guidelines are to be followed at all times.
3. Clearly identify the **generator (should be the Client)** of the lead contaminated waste shipments in the project contract. Ensure that UDOT's name is not on any Hazardous Waste Manifest or other disposal documentation, **AND** ensure that a client representative, not an UDOT employee, signs all disposal documentation/manifests.
4. Give all original paperwork to the Client representative and only keep photocopies at the jobsite. Send copies of paperwork to the Safety/Risk Managers. Remember, if the client is the generator; **DO NOT** keep any original paperwork!



Any scrap steel painted with known lead base paint that is disposed of through a scrap metal dealer requires that a letter be generated by project management to the dealer stating that the steel is painted with lead based paint and could cause a health hazard to anyone working with the steel such as burning or cutting directly on painted surfaces. The scrap dealer must be either shredding or melting down the steel. Otherwise it is considered a hazardous waste.

## RESPIRATORY SELECTION GUIDE CHART

Typical lead activities listed below require appropriate respiratory protection be used during the airborne lead monitoring assessment period.

Airborne lead monitoring results could change respirator type required to complete lead work activity.

Air monitoring conducted which reflect lower results than what is required for respiratory protection listed below may allow a lower protective respirator type.

### RESPIRATORY SELECTION GUIDE

#### PROPER RESPIRATORY PROTECTION WITH LEAD FUME/DUST ACTIVITY

RESPIRATOR	PROTECTION FACTORS	TYPICAL LEAD ACTIVITIES
<div>HALF/FULL FACE, PAPR, SUPPLIED AIR, SCBA</div> <div>(HIGH EFFICIENCY FILTERS)</div>	<div>UP TO 500 UG/M3</div> <div>ALLOWABLE LIMIT (10XPEL)</div>	<div>-SPRAY PAINTING WITH LEAD PAINT -MANUAL DEMOLITION (DRY WALL) -MANUAL SANDING AND SCRAPING -POWER TOOL CLEANING WITH DUST COLLECTION SYSTEM -HEAT GUN APPLICATION</div>
<div>*FULL FACE, PAPR SUPPLIED AIR, SCBA</div> <div>*Full face allowed only if quantitatively fit tested.</div> <div>(HIGH EFFICIENCY FILTERS)</div>	<div>BETWEEN 500 TO 2500 UG/M3</div> <div>ALLOWABLE LIMIT (50XPEL)</div>	<div>-RIVET BUSTING -LEAD BURNING, USING LEAD CONTAINING MORTAR -POWER TOOL CLEANING WITHOUT  DUST COLLECTION SYSTEM -CLEANUP OF DRY EXPANDABLE ABRASIVES -MOVEMENT/REMOVAL OF BLASTING ENCLOSURES</div>
<div>SUPPLIED AIR, SCBA</div>	<div>OVER 2500 UG/M3</div> <div>ALLOWABLE LIMIT (&gt;50XPEL)</div>	<div>-ABRASIVE BLASTING -WELDING -TORCH BURNING -OXY-FUEL GAS CUTTING</div>
<div>SUPPLIED AIR, SCBA</div>	<div>OVER 2500 UG/M3</div> <div>ALLOWABLE LIMIT (&gt;50XPEL)</div>	<div>-ALL OTHER NON-TYPICAL LEAD ACTIVITIES INVOLVING AIRBORNE EXPOSURE</div>

## MEDICAL SURVEILLIANCE

### Blood Lead Exposure Levels

#### Blood Lead Results

- |                     |  |
|---------------------|--|
| <30 ug/dl           | <ul style="list-style-type: none"><li>• Send written notification of results within 5 days to employee's home</li></ul>  |
| >30 ug/dl <40 ug/dl | <ul style="list-style-type: none"><li>• Project provides verbal results to employees on site</li><li>• Send written notification of results within 5 days to employee's home. Project provides verbal results to employee</li><li>• UDOT action level, project to counsel with employee looking into practices of hygiene and personal protection</li><li>• Complete first report of incident</li></ul>  |
| >40 ug/dl <50 ug/dl | <ul style="list-style-type: none"><li>• Send written notification of results within 5 days to employee's home. Project provides verbal results to employee</li><li>• Remove from lead work areas</li><li>• Conduct more frequent blood lead testing (monthly) until 2 test results show levels &lt;40 ug/dl before returning employee to lead work areas</li><li>• Evaluate/counsel with employee to determine source of higher than normal lead results. Coach on personal hygiene, check respirator fit, and consider using a higher level of respiratory protection</li><li>• Complete first report of injury</li><li>• Offer employee medical exam and/or consultation. Have medical exam decline form signed if employee declines.</li></ul>  |
| >50 ug/dl           | <ul style="list-style-type: none"><li>• Send written notification of results within 5 days to employee's home. Project provides verbal results to employee</li><li>• Remove from lead work areas</li><li>• Conduct more frequent blood lead testing (at least monthly) until 2 test results show levels &lt;40 ug/dl before returning employee to lead work areas. Initial follow up must be within 2 weeks of receiving the results from the first blood sampling with level over 50 ug/dl.</li><li>• Evaluate/counsel with employee to determine source of higher than normal lead results. Coach on personal hygiene, check respirator fit, and consider using a higher level of respiratory protection</li><li>• Complete first report of injury</li><li>• Record on OSHA 200 log as a job recordable illness</li><li>• Final medical determination (written medical opinion) on employee's health status required by UDOT</li></ul> |

**NOTE:** Removal from lead work areas may also be a physician order regardless of the blood lead level if the physician is concerned that either the patient has/or may develop a lead related illness or that aggravation of a pre-existing condition may/has occurred.

## AIRBORNE LEAD MONITORING

**I. Below Action Level:**

**Results (Conc.):**    **<30 ug/m<sup>3</sup> - 8 hr shift (TWA)**  
                               **<24 ug/m<sup>3</sup> - 10 hr shift(TWA)**  
                               **<20 ug/m<sup>3</sup> - 12 hr shift (TWA)**

### Minimum Action Required:

- Ensure affected employees are current with UDOT's medical surveillance monitoring (blood lead/ZPP testing). Refer to section E of this bulletin.
- Discontinue air monitoring unless activity conditions change, when two consecutive tests 7 days apart show  $<30 \text{ ug/m}^3$ .
- Provide for wash facilities.
- Written notification to affected employees within 5 days of air monitoring and blood lead results.
- Provide for engineering, administrative, and work practice controls as feasible.
- Minimal respiratory protection required unless results show zero detectable limits, fit tests current within last 12 months.
- No tobacco, food, or drinks in lead areas.
- Conduct hazardous communications (RTK) and lead program training (activity planning).

## II. Above the action level but below the PEL:

**Results (Conc.):** >30 ug/m3 <50 ug/m3 - 8 hr shift (TWA)  
>24 ug/m3 <40 ug/m3 -10 hr shift (TWA)  
>20 ug/m3 <33 ug/m3 - 12 hr shift (TWA)

**Minimum Action Required:**

- Ensure affected employees are current with UDOT's medical surveillance monitoring (blood lead/ZPP testing). Refer to section E of this bulletin.
- Increase blood lead testing to every 6 months and every 6 months thereafter when employees are expected to be exposed > 30 days/year at levels > action level.
- Continue air monitoring every 6 months unless activity conditions change.
- Provide for wash facilities.
- Written notification to affected employees within 5 days of air monitoring and blood lead results.
- Provide for engineering, administrative, and work practice controls as needed.
- Require minimum respiratory protection (10xPEL), fit tests current within last 12 months.
- No tobacco, food, or drinks in lead area.
- Clearly establish controlled exit points from lead work areas and monitor employee hygiene practices.
- Conduct hazardous communications (RTK) and lead program training (activity planning).
- Review and update as required lead work activity plans every 6 months.

- Employees must be offered a medical exam and/or consultation if working in lead area for more than 30 days in any previous 12 month period and blood lead level result is >40 ug/dl.

### III. Above the PEL:

<u>Results (Conc.):</u>	<u>&gt;50 ug/m3 (PEL) - 8 hr shift (TWA)</u>
	<u>&gt;40 ug/m3 (PEL) - 10 hr shift (TWA)</u>
	<u>&gt;33 ug/m3 (PEL) - 12 hr shift (TWA)</u>

#### Minimum Action Required:

- Ensure affected employees are current with UDOT's medical surveillance monitoring (blood lead/ZPP testing). Refer to section E of this bulletin.
- Contact the Safety Department immediately to establish increased frequency for blood lead testing.
- Continue air monitoring every 3 months unless activity conditions change.
- Make available wash and shower facilities.
- Provide clean protective clothing (coveralls, gloves, hats, shoes, and shoe covers) weekly. (Daily if levels >200 ug/m3).
- Ensure lead levels from surface contamination in change facilities and break areas does not exceed 200 ug/ft2.
- Written notification to affected employees within 5 days of air monitoring and blood lead results.
- Provide for engineering, administrative, and work practice controls as needed.
- No tobacco, food, or drink in lead area.
- Clearly establish controlled exit points from lead work areas and monitor employee hygiene practices.
- Require minimum respiratory protection (50xPEL), fit tests current within last 12 months.
- Conduct hazardous communications (RTK) and lead program training (activity planning).
- Review and update as necessary lead activity plans every 6 months.
- Post lead work areas with signs, "Warning Lead Work Area Poison No Smoking or Eating".
- Employees must be offered a medical exam and/or consultation if working in lead area for more than 30 days in any previous 12 month period and blood lead level results is >40 ug/dl.

## OSHA EMPLOYEE STANDARD SUMMARY

### OSHA Federal Regulations

#### **Appendix B to Sec. 1926.62 - Employee Standard Summary**

(EDITOR'S NOTE: The information contained in the appendices to this section is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from existing obligation.)

This appendix summarizes key provisions of the interim final standard for lead in construction that you as a worker should become familiar with.

##### *I. Permissible Exposure Limit (PEL) - Paragraph (C)*

The standard sets a permissible exposure limit (PEL) of 50 micrograms of lead per cubic meter of air (50 ug/m<sup>3</sup>), averaged over an 8-hour workday which is referred to as a time-weighted average (TWA). This is the highest level of lead in air to which you may be permissibly exposed over an 8-hour workday. However, since this is an 8-hour average, short exposures above PEL are permitted so long as for each 8-hour day your average exposure does not exceed this level. This interim final standard, however, takes into account the fact that your daily exposure to lead can extend beyond a typical 8-hour workday as the result of overtime or other alterations in your work schedule. To deal with this situation, the standard contains a formula that reduces your permissible exposure when you are exposed more than 8 hours. For example, if you were exposed to lead for 10 hours a day, the maximum permitted average exposure would be 40 ug/m<sup>3</sup>.

##### *II. Exposure assessment - Paragraph (D)*

If lead is present in your workplace in any quantity, your employer is required to make an initial determination of whether any employee's exposure to lead exceeds the action level (30 ug/m<sup>3</sup> averaged over an 8-hour day). Employee exposure is that exposure which would occur if the employee were not using a respirator. This initial determination requires your employer to monitor workers' exposures unless he or she has objective data that can demonstrate conclusively that no employee will be exposed to lead in excess of the action level. Where objective data is used in lieu of actual monitoring the employer must establish and maintain an accurate record, documenting its relevancy in assessing exposure levels for current job conditions. If such objective data is available, the employer need proceed no further on employee exposure assessment until such time that conditions have changed and the determination is no longer valid.

Objective data may be compiled from various sources, e.g., insurance companies and trade associations and information from suppliers or exposure data collected from similar operations. Objective data may also comprise previously collected sampling data including area monitoring. If it cannot be determined through using objective data that worker exposure is less than the action level, your employer must conduct monitoring or must rely on relevant previous personal sampling, if available. Where

monitoring is required for the initial determination, it may be limited to a representative number of employees who are reasonably expected to have the highest exposure levels. If your employer has conducted appropriate air sampling for lead in the past 12 months, he or she may use these results, provided they are applicable to the same employee tasks and exposure conditions and meet the requirements for accuracy as specified in the standard. As with objective data, if such results are relied upon for the initial determination, your employer must establish and maintain a record as to the relevancy of such data to current job conditions.

If there have been any employee complaints of symptoms which may be attributed to exposure to lead or if there is any other information or observations which would indicate employee exposure to lead, this must also be considered as part of the initial determination.

If this initial determination shows that a reasonable possibility exists that any employee may be exposed, without regard to respirators, over the action level, your employer must set up an air-monitoring program to determine the exposure level representative of each employee exposed to lead at your workplace. In carrying out this air-monitoring program, your employer is not required to monitor the exposure of every employee, but he or she must monitor a representative number of employees and job types. Enough sampling must be done to enable each employee's exposure level to reasonably represent full shift exposure. In addition, these air samples must be taken under conditions that represent each employee's regular, daily exposure to lead. Sampling performed in the past 12 months may be used to determine exposures above the action level if such sampling was conducted during work activities essentially similar to present work conditions.

The standard lists certain tasks which may likely result in exposures to lead in excess of the PEL and, in some cases, exposures in excess of 50 times the PEL. If you are performing any of these tasks, your employer must provide you with appropriate respiratory protection, protective clothing and equipment, change areas, hand washing facilities, biological monitoring, and training until such time that an exposure assessment is conducted which demonstrates that your exposure level is below the PEL.

If you are exposed to lead and air sampling is performed, your employer is required to notify you in writing within 5 working days of the air monitoring results that represent your exposure. If the results indicate that your exposure exceeds the PEL, (without regard to your use of a respirator), then your employer must also notify you of this in writing, and provide you with a description of the corrective action that has been taken or will be taken to reduce your exposure.

Your exposure must be rechecked by monitoring, at least every six months, if your exposure is at or over the action level but below the PEL. Your employer may discontinue monitoring for you if 2 consecutive measurements, taken at least 7 days apart, are at or below the action level. Air monitoring must be repeated every 3 months if you are exposed over the PEL. Your employer must continue monitoring for you at this frequency until 2 consecutive measurements, taken at least 7 days apart, are below the PEL but above the action level, at which time your employer must repeat monitoring of your exposure every six months and may discontinue monitoring only after your exposure drop to or below the action level. However, whenever there is a change of

equipment, process, control, or personnel or a new type of job is added at your workplace that may result in new or additional exposure to lead, your employer must perform additional monitoring.

### *III. Methods of Compliance - Paragraph (E)*

Your employer is required to assure that no employee is exposed to lead in excess of the PEL as an 8-hour TWA. The interim final standard for lead in construction requires employers to institute engineering and work practice controls including administrative controls to the extent feasible to reduce employee exposure to lead. Where such controls are feasible but not adequate to reduce exposures below the PEL they must be used nonetheless to reduce exposures to the lowest level that can be accomplished by these means and then supplemented with the appropriate respiratory protection.

Your employer is required to develop and implement a written compliance program prior to the commencement of any job where employee exposures may reach the PEL as an 8-hour TWA. The interim final standard identifies the various elements that must be included in the plan. For example, employers are required to include a description of operations in which lead is emitted, detailing other relevant information about the operation such as the type of equipment used, the type of material involved, employee job responsibilities, operating procedures and maintenance practices. In addition, your employer's compliance plan must specify the means that will be used to achieve compliance and, where engineering controls are required, include any engineering plans or studies that have been used to select the control methods. If administrative controls involving job rotation are used to reduce employee exposure to lead, the job rotation schedule must be included in the compliance plan. The plan must also detail the type of protective clothing and equipment, including respirators, housekeeping and hygiene practices that will be used to protect you from the adverse effects of exposure to lead.

The written compliance program must be made available, upon request, to affected employees and their designated representatives, the Assistant Secretary and the Director.

Finally, the plan must be reviewed and updated at least every 6 months to assure it reflects the current status in exposure control

### *IV. Respiratory Protection - Paragraph (F)*

Your employer is required to provide and assure your use of respirators when your exposure to lead is not controlled below the PEL by other means. The employer must pay the cost of the respirator. Whenever you request one, your employer is also required to provide you a respirator even if your air exposure level is not above the PEL. You might desire a respirator when, for example, you have received medical advice that your lead absorption should be decreased. Or, you may intend to have children in the near future, and want to reduce the level of lead in your body to minimize adverse reproductive effects. While respirators are the least satisfactory means of controlling your exposure, they are capable of providing significant protection if properly chosen, fitted, worn, cleaned, maintained, and replaced when they stop providing adequate protection.



Your employer is required to select respirators from the types listed in Table I of the Respiratory Protection section of the standard (1926.62(f)). Any respirator chosen must be approved by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 42 CFR part 84. This respirator selection table will enable your employer to choose a type of respirator that will give you a proper amount of protection based on your airborne lead exposure. Your employer may select a type of respirator that provides greater protection than that required by the standard; that is, one recommended for a higher concentration of lead than is present in your workplace. For example, a powered air-purifying respirator (PAPR) is much more protective than a typical negative pressure respirator, and may also be more comfortable to wear. A PAPR has a filter, cartridge, or canister to clean the air, and a power source that continuously blows filtered air into your breathing zone. Your employer might make a PAPR available to you to ease the burden of having to wear a respirator for long periods of time. The standard provides that you can obtain a PAPR upon request.

Your employer must also start a Respiratory Protection Program. This program must include written procedures for the proper selection, use, cleaning, storage, and maintenance of respirators.

Your employer must ensure that your respirator facepiece fits properly. Proper fit of a respirator facepiece is critical to your protection from airborne lead. Obtaining a proper fit on each employee may require your employer to make available several different types of respirator masks. To ensure that your respirator fits properly and that facepiece leakage is minimal, your employer must give you either a qualitative or quantitative fit test as specified in Appendix A of the Respiratory Protection standard located at 29 CFR 1910.134.

You must also receive from your employer proper training in the use of respirators. Your employer is required to teach you how to wear a respirator, to know why it is needed, and to understand its limitations.

Your employer must test the effectiveness of your negative pressure respirator initially and at least annually thereafter with a "qualitative fit test". In this test, the fit of the facepiece is checked by seeing if you can smell a substance placed outside the respirator. If you can, there is appreciable leakage where the facepiece meets your face.

The standard provides that if your respirator uses filter elements, you must be given an opportunity to change the filter elements whenever an increase in breathing resistance is detected. You also must be permitted to periodically leave your work area to wash your face and respirator facepiece whenever necessary to prevent skin irritation. If you ever have difficulty in breathing during a fit test or while using a respirator, your employer must make a medical examination available to you to determine whether you can safely wear a respirator. The result of this examination may be to give you a positive pressure respirator (which reduces breathing resistance) or to provide alternate means of protection.

## V. *Protective Work Clothing and Equipment - Paragraph (G)*

If you are exposed to lead above the PEL as an 8-hour TWA, without regard to your use of a respirator, or if you are exposed to lead compounds such as lead arsenate or lead arsenite which can cause skin and eye irritation, your employer must provide you with protective work clothing and equipment appropriate for the hazard. If work clothing is provided, it must be provided in a clean and dry condition at least weekly, and daily if your airborne exposure to lead is greater than 200 ug/m<sup>3</sup>. Appropriate protective work clothing and equipment can include coveralls or similar full-body work clothing, gloves, hats, shoes or disposable shoe coverlets, and face shields or vented goggles. Your employer is responsible for providing repairs and replacement as necessary, and also is responsible for cleaning, laundering or disposal of protective clothing and equipment.

The interim final standard requires that your employer assures that you follow good work practices when you are working in areas where your exposure to lead may exceed the PEL. With respect to protective clothing and equipment, where appropriate, the following procedures should be observed prior to beginning work:

1. Change into work clothing and shoe covers in a clean section of the designated changing areas
2. Use work garments and appropriate protective gear, including respirators before entering the work area
3. Store any clothing not worn under protective clothing in the designated changing area.

Workers should follow these procedures upon leaving the work area:

1. HEPA vacuum heavily contaminated protective work clothing while it is still being worn. At no time may lead be removed from protective clothing by any means which may result in uncontrolled dispersal of lead into the air.
2. Remove shoe covers and leave them in the work area
3. Remove protective clothing and gear in the dirty area of the designated changing area. Remove protective coveralls by carefully rolling down the garment to reduce exposure to dust.
4. Remove respirators last.
5. Wash hands and face.

Workers should follow these procedures upon finishing work for the day (in addition to procedures described above):

1. Where applicable, place disposal coveralls and shoe covers with the abatement waste;
2. Contaminated clothing that is to be cleaned, laundered or disposed of must be placed in closed containers in the change room.
3. Clean protective gear, including respirators, according to standard procedures;
4. Wash hands and face again. If showers are available, take a shower and wash hair. If shower facilities are not available at the work site, shower immediately at home and wash hair.

## *VI. Housekeeping - Paragraph (H)*

Your employer must establish a housekeeping program sufficient to maintain all surfaces as free as practicable of accumulations of lead dust. Vacuuming is the preferred method of meeting this requirement, and the use of compressed air to clean floors and other surfaces is generally prohibited unless removal with compressed air is done in conjunction with ventilation systems designed to contain dispersal of the lead dust. Dry or wet sweeping, shoveling, or brushing may not be used except where vacuuming or other equally effective methods have been tried and do not work. Vacuums must be used equipped with a special filter called a high-efficiency particulate air (HEPA) filter and emptied in a manner that minimizes the reentry of lead into the workplace.

## *VII. Hygiene Facilities and Practices - Paragraph (I)*

The standard requires that hand washing facilities be provided where occupational exposure to lead occurs. In addition, change areas, showers (where feasible), and lunchrooms or eating areas are to be made available to workers exposed to lead above the PEL. Your employer must assure that except in these facilities, food and beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, where airborne exposures are above the PEL. Change rooms provided by your employer must be equipped with separate storage facilities for your protective clothing and equipment and street clothes to avoid cross-contamination. After showering, no required protective clothing or equipment worn during the shift may be worn at home. It is important that contaminated clothing or equipment be removed in change areas and not to be worn home or you will extend your exposure to your family since lead from your clothing can accumulate in your house, car, etc.

Lunchrooms or eating areas may not be entered with protective clothing or equipment unless vacuuming, downdraft booth, or other cleaning method has removed surface dust. Finally, workers exposed above the PEL must wash both their hands and faces prior to eating, drinking, smoking or applying cosmetics.

All of the facilities and hygiene practices just discussed are essential to minimize additional sources of lead absorption from inhalation or ingestion of lead that may accumulate on you, your clothes, or your possessions. Strict compliance with these provisions can virtually eliminate several sources of lead exposure that significantly contribute to lead absorption.

## *VIII. Medical Surveillance - Paragraph (J)*

The medical surveillance program is part of the standard's comprehensive approach to the prevention of lead-related disease. Its purpose is to supplement the main thrust of the standard that is aimed at minimizing airborne concentrations of lead and sources of ingestion. Only medical surveillance can determine if the other provisions of the standard have effectively protected you as an individual. Compliance with the standard's provision will protect most workers from the adverse effects of lead exposure, but may not be satisfactory to protect individual workers (1) who have high body burdens of lead acquired over past years, (2) who have additional uncontrolled sources

of non-occupational lead exposure, (3) who exhibit unusual variations in lead absorption rates, or (4) who have specific non-work related medical conditions which could be aggravated by lead exposure (e.g., renal disease, anemia). In addition, control systems may fail, or hygiene and respirator programs may be inadequate. Periodic medical surveillance of individual workers will help detect those failures. Medical surveillance will also be important to protect your reproductive ability-regardless of whether you are a man or woman.

All medical surveillance required by interim final standards must be performed by or under the supervision of a licensed physician. The employer must provide required medical surveillance without cost to employees and at a reasonable time and place. The standard's medical surveillance program has two parts - periodic biological monitoring and medical examinations. Your employer's obligation to offer you medical surveillance is triggered by the results of the air monitoring program. Full medical surveillance must be made available to all employees who are or may be exposed to lead in excess of the action level for more than 30 days a year and whose blood lead level exceeds 40 ug/dl. Initial medical surveillance consisting of blood sampling and analysis for lead and zinc protoporphyrin must be made available to all employees exposed at any time (1 day) above the action level.

Biological monitoring under the standard must be provided at least every 2 months for the first 6 months and every 6 months thereafter until your blood lead level is below 40 ug/dl. A zinc protoporphyrin (ZPP) test is a very useful blood test that measures an adverse metabolic effect of lead on your body and is therefore an indicator of lead toxicity.

If your BLL exceeds 40 ug/dl the monitoring frequency must be increased from every 6 months to at least every 2 months and not reduced until two consecutive BLLs indicate a blood lead level below 40 ug/dl. Each time your BLL is determined to be over 40 ug/dl, your employer must notify you of this in writing within five working days of his or her receipt of the test results. The employer must also inform you that the standard requires temporary medical removal with economic protection when your BLL exceeds 50 ug/dl. (See Discussion of Medical Removal Protection-Paragraph (k).) Anytime your BLL exceeds 50 ug/dl your employer must make available to you within two weeks of receipt of these test results a second follow-up BLL test to confirm your BLL. If the two tests both exceed 50 ug/dl, and you are temporarily removed, then your employer must make successive BLL tests available to you on a monthly basis during the period of your removal.

Medical examinations beyond the initial one must be made available on an annual basis if your blood lead level exceeds 40 ug/dl at any time during the preceding year and you are being exposed above the airborne action level of 30 ug/m<sup>3</sup> for 30 or more days per year. The initial examination will provide information to establish a baseline to which subsequent data can be compared.

An initial medical examination to consist of blood sampling and analysis for lead and zinc protoporphyrin must also be made available (prior to assignment) for each employee being assigned for the first time to an area where airborne concentration of lead equals or exceeds the action level at any time. In addition, a medical examination

or consultation must be made available as soon as possible if you notify your employer that you are experiencing signs or symptoms commonly associated with lead poisoning or that you have difficulty breathing while wearing a respirator or during a respirator fit test. You must also be provided a medical examination or consultation if you notify your employer that you desire medical advice concerning the effects of current or past exposure to lead on your ability to procreate a healthy child.

Finally, appropriate follow-up medical examinations or consultations may also be provided for employees who have been temporarily removed from exposure under the medical removal protection provisions of the standard. (See Part IX, below.)

The standard specifies the minimum content of pre-assignment and annual medical examinations. The content of other types of medical examinations and consultations is left up to the sound discretion of the examining physician. Pre-assignment and annual medical examinations must include (1) a detailed work history and medical history; (2) a thorough physical examination, including an evaluation of your pulmonary status if you will be required to use a respirator; (3) a blood pressure measurement; (4) a series of laboratory tests designed to check your blood chemistry and your kidney function. In addition, at any time upon your request, a laboratory evaluation of male fertility will be made (microscopic examination of a sperm sample), or a pregnancy test will be given.

The standard does not require that you participate in any of the medical procedures, tests, etc. which your employer is required to make available to you. Medical surveillance can, however, play a very important role in protecting your health. You are strongly encouraged, therefore, to participate in a meaningful fashion. The standard contains a multiple physician review mechanism that will give you a chance to have a physician of your choice directly participate in the medical surveillance program. If you are dissatisfied with an examination by a physician chosen by your employer, you can select a second physician to conduct an independent analysis. The two doctors would attempt to resolve any differences of opinion, and select a third physician who conducts medical surveillance under the lead standard-unless you and your employer can agree on the choice of a physician or physicians. Some companies and unions have agreements in advance, for example, to use certain independent medical laboratories or panels of physicians. Any of these arrangements are acceptable so long as required medical surveillance is made available to workers.

The standard requires your employer to provide certain information to a physician to aid in his or her examination of you. This information includes (1) the standard and its appendices, (2) a description of your duties as they relate to occupational lead exposure, (3) your exposure level or anticipated exposure level, (4) a description of any personal protective equipment you wear, (5) prior blood lead level results, and (6) prior written medical opinions concerning you that the employer has. After a medical examination or consultation the physician must prepare a written report which must contain (1) the physician's opinion as to whether you have any medical condition which places you at increased risk of material impairment to health from exposure to lead, (2) any recommended special protective measures to be provided to you, (3) any blood lead level determinations, and (4) any recommended limitation on your use of respirators. This last element must include a determination of whether you can wear a

powered air-purifying respirator (PAPR) if you are found unable to wear a negative pressure respirator.

The medical surveillance program of the interim lead standard may at some point in time serve to notify certain workers that they have acquired a disease or other adverse medical condition as a result of occupational lead exposure. If this is true, these workers might have legal rights to compensation from public agencies, their employers, firms that supply hazardous products to their employers, or other persons. Some states have laws, including worker compensation laws, which disallow a worker who learns of a job-related health impairment to sue, unless the worker sues within a short period of time after learning of the impairment. (This period of time may be a matter of months or years.) An attorney can be consulted about these possibilities. It should be stressed that OSHA is in no way trying to either encourage or discourage claims or lawsuits. However, since results of the standard's medical surveillance program can significantly affect the legal remedies of a worker who has acquired a job-related disease or impairment, it is proper for OSHA to make you aware of this.

The medical surveillance section of the standard also contains provisions dealing with chelation. Chelation is the use of certain drugs (administered in pill form or injected into the body) to reduce the amount of lead absorbed in body tissues. Experience accumulated by medical and scientific communities has largely confirmed the effectiveness of this type of therapy for the treatment of very severe lead poisoning. On the other hand, it has also been established that there can be a long list of extremely harmful side effects associated with the use of chelating agents. The medical community has balanced the advantages and disadvantages resulting from the use of chelating agents in various circumstances and has established when the use of these agents is acceptable. The standard includes these accepted limitations due to a history of abuse of chelation therapy by some lead companies. The most widely used chelating agents are calcium disodium EDTA, (CaNa<sub>2</sub> EDTA), calcium disodium versenate (versenate), and d-penicillamine (pencillamine or cupramine).

The standard prohibits "prophylactic chelation" of any employee by any person the employer retains, supervises or controls. "Prophylactic chelation" is the routine use of chelating or similarly acting drugs to prevent elevated blood lead levels in workers who are occupationally exposed to lead, or the use of these drugs to routinely lower blood lead levels to predesignated concentrations believed to be "safe". It should be emphasized that where an employer takes a worker who has no symptoms of lead poisoning and has chelation carried out by a physician (either inside or outside of a hospital) solely to reduce the worker's blood lead level that will generally be considered prophylactic chelation. The use of a hospital and a physician does not mean that prophylactic chelation is not being performed. Routine chelation to prevent increased or reduce current blood lead levels is unacceptable whatever the setting.

The standard allows the use of "therapeutic" or "diagnostic" chelation if administered under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring. Therapeutic chelation responds to severe lead poisoning where there are marked symptoms. Diagnostic chelation involved giving a patient a dose of the drug then collecting all urine excreted for some period of time as aid to the diagnosis of lead poisoning.

In cases where the examining physician determines that chelation is appropriate, you must be notified in writing of this fact before such treatment. This will inform you of a potentially harmful treatment, and allow you to obtain a second opinion.

#### *IX. Medical Removal Protection - Paragraph (K)*

Excessive lead absorption subjects you to increased risk of disease. Medical removal protection (MRP) is a means of protecting you when, for whatever reasons, other methods, such as engineering controls, work practices, and respirators, have failed to provide the protection you need. MRP involves the temporary removal of a worker from his or her regular job to a place of significantly lower exposure without any loss of earnings, seniority, or other employment rights or benefits. The purpose of this program is to ease further lead absorption and allow your body to naturally excrete lead that has previously been absorbed. Temporary medical removal can result from an elevated blood lead level, or a medical opinion. For up to 18 months, or for as long as the job the employee was removed from lasts, protection is provided as a result of either form of removal. The vast majority of removed workers, however, will return to their former jobs long before this eighteen month period expires.

You may also be removed from exposure even if your blood lead level is below 50 ug/dl if a final medical determination indicates that you temporarily need reduced lead exposure for medical reasons. If the physician who is implementing your employers medical program makes a final written opinion recommending your removal or other special protective measures, your employer must implement the physician's recommendation. If you are removed in this manner, you may only be returned when the doctor indicates that it is safe for you to do so.

The standard does not give specific instructions dealing with what an employer must do with a removed worker. Your job assignment upon removal is a matter for you, your employer and your union (if any) to work out consistent with existing procedures for job assignments. Each removal must be accomplished in a manner consistent with existing collective bargaining relationships. Your employer is given broad discretion to implement temporary removals so long as no attempt is made to override existing agreements. Similarly, a removed worker is provided no right to veto an employer's choice that satisfies the standard.

In most cases, employers will likely transfer employees to other jobs with sufficiently low lead exposure. Alternately, a worker's hours may be reduced so that the time weighted average exposure is reduced, or he or she may be temporarily laid off if no other alternative is feasible.

In all of these situations, MRP benefits must be provided during the period of removal - i.e., you continue to receive the same earnings, seniority, and other rights and benefits you would have had if you had not been removed. Earnings include more than just your base wage; it includes overtime, shift differentials, incentives, and other compensation you would have earned if you had not been removed. During the period of removal you must also be provided with appropriate follow-up medical surveillance. If you were removed because your blood lead level was too high, you must be provided with a

monthly blood test. If a medical opinion caused your removal, you must be provided with medical tests or examinations that the doctor believes to be appropriate. If you do not participate in this follow up medical surveillance, you may lose your eligibility for MRP benefits.

When you are medically eligible to return to your former job, your employer must return you to your "former job status". This means that you are entitled to the position, wages, benefits, etc., you would have had if you had not been removed. If you would still be in your old job if no removal had occurred that is where you go back. If not, you are returned consistent with whatever job assignment discretion your employer would have had if no removal had occurred. MRP only seeks to maintain your rights, not expand them or diminish them. If you are removed under MRP and you are also eligible for worker compensation or other compensation for lost wages, your employer's MRP benefits obligation is reduced by the amount that you actually receive from these other sources. This is also true if you obtain other employment during the time you are laid off with MRP benefits.

The standard also covers situations where an employer voluntarily removes a worker from exposure to lead due to the effects of lead on the employee's medical condition, even though the standard does not require removal. In these situations MRP benefits must still be provided as though the standard required removal. Finally, it is important to note that in all cases where removal is required, respirators cannot be used as a substitute. Respirators may be used before removal becomes necessary, but not as an alternative to a transfer to a low exposure job, or to a lay-off with MRP benefits.

#### *X. Employee Information and Training - Paragraph (L)*

Your employer is required to provide information and training program for all employees exposed to lead above the action level or who may suffer skin or eye irritation from lead compounds such as lead arsenate or lead aside. The program must train these employees regarding the specific hazards associated with their work environment, protective measures which can be taken, including the contents of any compliance plan in effect, the danger of lead to their bodies (including their reproductive systems), and their rights under the standard. All employees must be trained prior to initial assignment to areas where there is a possibility of exposure over the action level.

This training program must also be provided at least annually thereafter unless further exposure above the action level will not occur.

#### *XI. Signs - Paragraph (M)*

The standard requires that the following warning sign be posted in work areas where the exposure to lead exceeds the PEL:

### **WARNING LEAD WORK AREA POISON NO SMOKING OR EATING**

These signs are to be posted and maintained in a manner that assures that the legend is readily visible.



## *XII. Recordkeeping - Paragraph (N)*

Your employer is required to keep all records of exposure monitoring for airborne lead. These records must include the name and job classification of employees measured, details of the sampling and analytical techniques, the results of this sampling, and the type of respiratory protection being worn by the person sampled. Such records are to be retained for at least 30 years. Your employer is also required to keep all records of biological monitoring and medical examination results. These records must include the names of the employees, the physician's written opinion, and a copy of the results of the examination. Medical records must be preserved and maintained for the duration of employment plus 30 years. However, if the employee's duration of employment is less than one year, the employer need not retain that employee's medical records beyond the period of employment if they are provided to the employee upon termination of employment.

Recordkeeping is also required if you are temporarily removed from your job under the medical removal protection program. This record must include your name and social security number, the date of your removal and return, how the removal was or is being accomplished, and whether or not the reason for the removal was an elevated blood lead level. Your employer is required to keep each medical removal record only for as long as the duration of an employee's employment.

The standard requires that if you request to see or copy environmental monitoring, blood lead level monitoring, or medical removal records, they must be made available to you or to a representative that you authorize. Your union also has access to these records. Medical records other than BLLs must also be provided upon request to you, to your physician or to any other person whom you may specifically designate. Your union does not have access to your personal medical records unless you authorize their access.

## *XIII. Observation of monitoring - Paragraph (O)*

When air monitoring for lead is performed at your workplace as required by this standard, your employer must allow you or someone you designate to act as an observer of the monitoring. Observers are entitled to an explanation of the measurement procedure, and to record the results obtained. Since results will not normally be available at the time of the monitoring, observers are entitled to record or receive the results of the monitoring when returned by the laboratory. Your employer is required to provide the observer with any personal protective devices required to be worn by employees working in the area that is being monitored. The employer must require the observer to wear all such equipment and to comply with all other applicable safety and health procedures.

## *XIV. Effective Date - Paragraph (P)*

The standard's effective date is June 3, 1993. Employer obligation under the standard begin as of that date with full implementation of engineering controls as soon as possible but no later than within 4 months, and all other provisions completed as soon as possible, but no later than within 2 months from the effective date.

*XV. For Additional Information*

- A. A copy of the interim standard for lead in construction can be obtained free of charge by calling or writing OSHA Office of Publication, room N-3101, United States Department of Labor, Washington, DC 20210: Telephone (202) 219-4667.
- B. Additional information about the standard, its enforcement, and your employer's compliance can be obtained from the nearest OSHA Area Office listed in your telephone directory under United States Government/Department of Labor.

## **LEAD ABATEMENT TRAILER USE PROCEDURES**

The contractor will provide a Lead Abatement Trailer if deemed necessary for lead abatement per the OSHA Standard. The Lead Abatement Trailer will have two separate rooms, one for protective work clothing/lead abatement equipment (dirty), and the other for street clothes (clean), this is done to prevent “cross contamination.”

The following features will be located in the protective work clothing/lead abatement equipment room:

- **Wash Station:** The wash station shall be used by all employees for the purposes of cleaning all exposed body parts prior to leaving the jobsite, and before eating lunch or using any tobacco products. Employees are also encouraged to use the wash station prior to use the restroom.
- **Showers:** Due to the potential unfeasibility of providing a shower, one may or may not be provided in the lead abatement trailer. If a shower unit is provided employees will be required to shower at the end of the shift prior to leaving the jobsite.
- **All Cleaning Agents:** All necessary cleaning agents will be provided for both the wash station and shower along with an adequate supply of towels.
- **Lead Vacuum:** A lead abatement vacuum with a HEPA filter will also be provided to ensure that the accumulation of potential airborne lead in the room is minimal.
- **Lead Contaminated Materials Trashcan:** For disposal of only lead contaminated materials; TyVek suits, Rags, Vacuumed debris, etc.
- **Lead Laundry Container:** For controlled storage of lead contaminated clothing that will be laundered.

When accessing the Lead Abatement Trailer the following shall be observed:

### **Reporting to Work:**

1. All employees will enter the lead abatement trailer through the door marked “CLEAN” from which they will switch into their work clothes that they will be wearing under their provided coveralls.
2. Once the employee is wearing their “work clothes” they will pass through the doorway to the protective work clothing/lead abatement equipment room, or dirty room, and continue to get dressed into their provided lead abatement clothing.
3. Employees will then remove their provided respirator from its clean storage area located inside the clothing/lead abatement equipment room and exit the trailer.

### **Leaving Work and Eating Lunch:**

1. Upon completion of the work shift, employees will enter the lead abatement trailer through the door marked “DIRTY.”
2. Employees will then “wipe down” their provided respirator and dispose of the used wipes in the Lead Contaminated Trashcan\*\*.
3. Employees will then remove their lead abatement clothes (coveralls, glove, etc.) and place them in the provided storage area in the clothing/lead abatement equipment room. If the provided clothing is soiled, it must be placed in the

provided Lead Contaminated Materials Trashcan if it is disposable, or in the Lead Laundry Container\*\*.

4. Next they will wash their hands and face in the provided wash station and dispose of any waste towels into the Lead Contaminated Materials Trashcan\*\*.
5. The employee will now thoroughly clean their provided respirator and place it in the clean storage area located inside the clothing/lead abatement equipment room.
6. Only at this time will employees then be allowed to pass through the doorway to the street clothes or "CLEAN" room. At which time they will remove their work clothes and place them in provided storage area and change into their street clothes.
7. At this time the Employee can exit the lead abatement trailer through the clean doorway.

*NOTE: ALL Doorways are equipped with a passage lock for privacy. Employees are encouraged to use the locks for this purpose and always respect the privacy of others.*

\*\*An explanation of lead hazards must also be provided to those responsible for cleaning or laundering the protective clothing. In addition, disposal or laundry containers have to be labeled:

**CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS.**

It is the responsibility of the Project Management to establish a lunch and/or break area outside of the lead abatement operations. At a minimum the lunch and/or break area should be at least 50' upwind of the lead abatement operation.

Furthermore, to ensure that any and all employees on a project are aware of UDOT's lead abatement operations, when they arrive at the jobsite, UDOT requires the posting of UDOT's Lead Work Area Signs prior to the start of the lead abatement process. These postings and/or signs clearly state:

**WARNING – LEAD WORK AREA – NO SMOKING OR EATING**

## APPENDICES

## **APPENDIX A**

### **INSPECTION CHECKLIST**

Included with these work practice controls is a Construction Safety Inspection Checklist and Quarterly Safety and Security Audit. These documents will be used by the UDOT Safety Risk Manager to conduct a Monthly Audit of the Contractors Safety Records and Performance. Once a Deficiency is identified the responsible Contractor will correct the problem immediately. Weekly safety and security inspections will be conducted with the Contractors site Safety Representative and the Engineer Safety.

Failure to correct an identified deficiency will result in administrative action being taken by the Engineer.

If an Imminent Risk situation is identified by anyone the hazard will be immediately corrected, work will be stopped until safety measures are taken. The Engineer UDOT Safety Risk Manager will be contacted.

### **SAFETY NOTICE OF NON-COMPLIANCE**

The UDOT Engineer will generate a Safety Notice of Non-Compliance when necessary.

Score: \_\_\_\_\_ of 100

## **UDOT WORK ZONE Inspection**

(Infraction weight: -1 minor -2 serious -3 severe x 2 for major or repeat)

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Speed Limit: \_\_\_\_\_ Case #: \_\_\_\_\_

Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_

Location: \_\_\_\_\_ Project #/Work: \_\_\_\_\_

### **FLAGGING**

### **GUIDANCE**

### **PROTECTION**

A. Flaggers certified?

G. Travel path defined?

N. Public protected?

B. Dressed properly?

H. Lane change/closure ok?

O. Warning of hazards?

C. Proper control of traffic?

I. Obsolete marks removed?

P. Flags on signs?

D. Proper work signs & paddle?

J. Devices clean/undamaged?

Q. Device removed/not in use?

E. Flaggers Visible?

K. Proper devices in taper?

R. Traffic devices comply?

F. Nighttime flagging/lights?

L. Special Provisions/Plans?

S. Attractive Nuisance?

M. UDOT Standard Spec's?

T. OTHER?

### **COMMENTS:**


### **SAFETY:**

1. Aerial lift tie off

12. Fire Extinguisher

23. ROPS

2. Air Hoses

13. First Aid Equipment

24. Qualified Operators

3. Back up alarms

14. Flammable Storage

25. Safety Bulletin Board

4. Chains

15. Fork Lifts

26. Sanitation Facilities

5. Confined space entry

16. Hand Rails on Platforms

27. Scaffolds + Inspection

6. Cranes / Platforms

17. Housekeeping

28. Seat Belt Use

7. Drinking Water

18. Impalement Protection

29. Tag Lines on Loads

8. Electrical Cords / GFCI

19. Ladder secure

30. Tool Box Meetings

9. Environmental

20. MSDS on Site

31. Welding Tank Storage

10. Excavation / Trench

21. PPE

32. Wheel Chocks

11. Fall Protection

22. Power Tools

33. OTHER

### **COMMENTS:**


**NAME:**

**TITLE:**

1.		
2.		
3.		
4.		
5.		

## Safety:

Rating will be based on the last three year average of Project Inspections. Scale used will be as follows:

1.	Average score 96% - 100%	1.3
2.	Average score 92% - 95%	1.1
3.	Average score 88% - 91%	0.7
4.	Average score 84% - 87%	0.5
5.	Average score 80% - 83%	0.3
6.	Average score 0% - 79%	0.0

## INSTRUCTIONS FOR ASSESSING POINT DEDUCTIONS ON WORK ZONE INSPECTIONS

The following definitions are to be used as a basis for assessing point deductions for violations determined by Work Zone Inspections. Multiple of two times the point deductions will be assessed for repeat and/or subsequent similar infractions on the same project.

- < **Minor** - An act or omission of failing to comply with applicable standards related to job safety and health that does not constitute an immediate danger, exposure or threaten bodily harm/injury or death to workers or the public.
- < **Serious** - An act or omission of failing to comply with applicable standards, specifications, special provisions, industry standards, etc. related to job safety and health and/or the loss project funds. Also, any act or omission that constitutes an immediate danger and exposure to bodily harm/injury and the substantial possibility of death to workers or the public.
- < **Severe** - An act or omission with intentional disregard or indifference to complying with applicable standards, specifications, special provisions, industry standards, etc. related to job safety and health and/or the loss of project funds. Any condition which results from the aforementioned performance that constitutes imminent danger and is immediately life threatening to workers or the public.

Note: Failure to abate and or repeat infractions that are SERIOUS or SEVERE constitutes willful neglect and will cause an immediate stoppage of the work until the noted infractions are corrected or abated.

"A completed work zone inspection report is **not a public record**. Distribution and Release is subject to Utah Codes 63A-4-206, 63A-4-207, 63-2-304(16) and 63-2-304(24)."

Inspections will be performed by designated Department personnel in conjunction with a contractor representative on each project. Each contractor being rated shall have a minimum of twelve (12) inspections performed on one or more projects during the three (3) year rating period. The three (3) year average rating will determine a contractor's eligibility to bid future projects.



## **APPENDIX B**

### **SPILL NOTIFICATION PROCEDURE**

**Initial determination as to the severity of the spill is the responsibility of the Contractor.**

EMERGENCY SPILL: The spill presents a potential for harm to personnel or the environment, the Contractor is not able to immediately control and clean-up the spill and/or the spill exceeds the reportable quantity the Contractor or Engineer Team Member will:

1. Clear and secure the immediate area.
2. Notify the UDOT Safety Risk Manager at: \_\_\_\_\_
3. Notify the Engineer
4. Notify the UDOT Construction Coordinator.
5. An incident report will be submitted within 24 hours to the Contracts Manager. The UDOT Safety Risk Manager will review the report and if necessary hold a Post incident meeting with the Contractor.

#### **NON-EMERGENCY SPILL:**

1. A non-emergency spill is a spill that does not present potential harm to personnel and/or the environment, the Contractor has the ability to immediately control and clean-up the spill, and the spill is less than 25 gallons.
2. All spills must be cleaned up and disposed of properly a spill report will be submitted to the ENGINEER explaining the spill quantity and method of disposal including Hazardous Waste Disposal Manifest if applicable.

The Contractor will notify the Engineer any time a spill occurs no matter what the size or nature of the spill involves.

## APPENDIX C

### CRANE – CRITICAL LIFT CHECKLIST

Date: \_\_\_\_\_ Project Name: \_\_\_\_\_  
To: \_\_\_\_\_ C.I.P. No.: \_\_\_\_\_ W.I.P. No.: \_\_\_\_\_  
\_\_\_\_\_ Contractor: \_\_\_\_\_  
Attn: \_\_\_\_\_ Contract No: \_\_\_\_\_  
From: \_\_\_\_\_ Location: \_\_\_\_\_  
Subject: \_\_\_\_\_ Description of lift: \_\_\_\_\_

### CRITICAL LIFT CHECKLIST

Definition: A critical lift is any lift that exceeds 90% of the crane's rated capacity, any lift involving more than one crane or any lift involving unusual or severe hazards.

1. Name of supervisor in charge of lift: \_\_\_\_\_
2. Name of crane operator: \_\_\_\_\_
3. Name of signal person(s) \_\_\_\_\_

The person in charge of the lift must check the following items.

#### 4. Pick Conditions

- A. Is the crane-pad level, firm and stable?
- B. Has the longest picking radius been measured?
- C. Have special hazards been identified?
  1. Power lines
  2. Obstruction in lift path
  3. Location of underground utilities or structures
  4. Weather conditions
- D. Has lift sequence been established and reviewed?
- E. Are unnecessary personnel clear of area?

OK	N/A

#### 5. Load Conditions

- A. Load weight \_\_\_\_\_ lbs.
- B. Weight of rigging \_\_\_\_\_ lbs.
- C. Weight of the load block and line \_\_\_\_\_ lbs.
- D. Has the Center of Gravity of the load been established & marked? \_\_\_\_\_Y\_\_\_\_\_N
- E. Is rigging adequate and in good condition? \_\_\_\_\_Y\_\_\_\_\_N

6. **Communication**

- A. Have hand signals been reviewed?
- B. Has location of spotters been established?
- C. If radios are used:
  - 1. Have they been tested from location of use?
  - 2. Is frequency clear of other radio traffic?

7. **Condition of Crane (checked by Operator)**

- A. Is pad blocking adequate and substantial?
- B. Is the crane level?
- C. Are ropes and pendants in good condition?
- D. Are adequate parts of line being used?
- E. Is line reeved properly?
- F. Are controls in good working condition to insure smooth operation.

- G. What is the boom length?
- H. What is the maximum boom angle?
- I. What is the maximum load radius?
- J. Is the load within chart limits for the above conditions?

OK	N/A

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_Y\_\_\_\_\_N

Has a pre-lift meeting been conducted with all persons involved to review this information?

\_\_\_\_\_Yes \_\_\_\_\_No

Signed: \_\_\_\_\_  
Supervisor

\_\_\_\_\_  
Project Manager

## APPENDIX D

### CONFINED SPACE ENTRY CHECKLIST

DATE: \_\_\_\_\_ CONTRACTOR: \_\_\_\_\_

CONTRACT #: \_\_\_\_\_

JOB SITE LOCATION: \_\_\_\_\_

DESCRIPTION OF SPACE: \_\_\_\_\_

TIME ISSUED: \_\_\_\_\_ TIME EXPIRES: \_\_\_\_\_

EMPLOYEES ENTERING SPACE: \_\_\_\_\_

\_\_\_\_\_

JOB SPECIFIC HAZARDS: \_\_\_\_\_

\_\_\_\_\_

INITIAL ATMOSPHERIC READING: \_\_\_\_\_ TIME: \_\_\_\_\_

OXYGEN: \_\_\_\_\_% LEL: \_\_\_\_\_% H<sub>2</sub>S: \_\_\_\_\_ppm CO: \_\_\_\_\_ppm

OTHER: \_\_\_\_\_ppm OTHER: \_\_\_\_\_ppm OTHER: \_\_\_\_\_ppm

CAN HAZARDS BE ELIMINATED? \_\_\_\_\_YES \_\_\_\_\_NO

RE-CLASSIFY AS NON-PERMIT ENTRY \_\_\_\_\_YES \_\_\_\_\_NO

QUALIFIED PERSON / SUPERVISOR: \_\_\_\_\_

#### CHECKLIST

LOCK OUT/TAG OUT _____	BLANK _____	PURGE _____
VENTILATION _____	STAND-BY _____	
HOT WORK PERMIT _____	FIRE EXTINGUISHERS _____	
FULL BODY HARNESS _____	LIFELINES _____	PPE _____
RESCUE EQUIPMENT _____	RESPIRATOR TYPE _____	
NON-SPARKING TOOLS _____	EXPLOSION PROOF LIGHTING _____	
ESCAPE EQUIPMENT _____	ESCAPE AIR _____	
CPR TRAINED ATTENDANT _____	SECURE AREA _____	
COMMUNICATION _____		

## **APPENDIX E**

### **ACCIDENT/INCIDENT INVESTIGATION REPORTS**

All Contractors will use the forms provided by their individual insurance carriers for accident/incident investigation reports.

## APPENDIX F

### JOB SAFETY ANALYSIS (JSA) WORKSHEET

Date: \_\_\_\_\_ Project Name: \_\_\_\_\_

To: \_\_\_\_\_ C.I.P. No.: \_\_\_\_\_ W.I.P. No.: \_\_\_\_\_

\_\_\_\_\_ Contractor: \_\_\_\_\_

Attn: \_\_\_\_\_ Contract No: \_\_\_\_\_

From: \_\_\_\_\_

Subject: \_\_\_\_\_

### JOB SAFETY ANALYSIS WORKSHEET

Title of Job Operation: \_\_\_\_\_ Date: \_\_\_\_\_ No. \_\_\_\_\_

Position/ Title of Person(s) Doing Work: \_\_\_\_\_ Analysis made by: \_\_\_\_\_

\_\_\_\_\_ Analysis Reviewed by: \_\_\_\_\_

Anticipated Date and Time Activity will Begin: \_\_\_\_\_

Sequence of Basic Job Steps	Potential Accidents or Hazards	Recommended Safe Job Procedures

1. Struck By (SB)
2. Struck Against (SA)
3. Contacted By (CB)
4. Contact With (CW)

5. Caught On (CO)
6. Caught In (CI)
7. Caught Between (CB)
8. Fall – Same Level (FS)

9. Fall to Below (FB)
10. Overextension (OE)
11. Exposure (E)

(CONTINUE ON ADDITIONAL PAGES AS NEEDED)



Date: \_\_\_\_\_  
 To: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Attn: \_\_\_\_\_  
 From: \_\_\_\_\_  
 Subject: \_\_\_\_\_

Project Name: \_\_\_\_\_  
 C.I.P. No.: \_\_\_\_\_  
 W.I.P. No.: \_\_\_\_\_  
 Contractor: \_\_\_\_\_  
 Contract No: \_\_\_\_\_

Employee Review Form		Hazardous Work Permit/Job Safety Analysis Sign-Off	
I have read the attached Hazardous Work Permit and/or JSA and understand the hazards associated with this job.			
Date	Time	Employer	Name

1. Struck By (SB)
2. Struck Against (SA)
3. Contacted By (CB)
4. Contact With (CW)

5. Caught On (CO)
6. Caught In (CI)
7. Caught Between (CB)
8. Fall – Same Level (FS)

9. Fall to Below (FB)
10. Overextension (OE)
11. Exposure (E)



## **APPENDIX G**

### **EMPLOYEE AND VISITOR LOGS**

All Contractors will be required to general and maintain a visitor log. The log shall be available to UDOT upon request.

## APPENDIX H

### SAFETY BELTS/HARNESS & LANYARDS INSPECTION RECORD

#### HARNESS INSPECTION CHECKLIST

EMPLOYEE NAME

EQUIPMENT #

SERIAL #

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

#### ITEMS TO INSPECT

Indicate OK or use an R to indicate REPLACE

BELT WEBBING or LEATHER\_\_\_\_

STITCHING\_\_\_\_\_

RIVETS & EYELETS\_\_\_\_

D-RINGS\_\_\_\_\_

BUCKLES\_\_\_\_\_

BODY PADS\_\_\_\_\_

SAFETY LATCHES ON HOOKS\_\_

FALL ARREST LANYARD\_\_\_\_\_

POSITIONING LANYARD\_\_\_\_

CERTIFICATION or DATA TAG\_\_\_\_\_

Inspection of equipment must be performed daily before use. Report and replace defective equipment immediately. **Do not use defective or personally owned equipment unless inspected by Competent Person.**

All components have been inspected and are in safe working condition \_\_\_\_\_YES \_\_\_\_\_NO

Additional Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
SSN

\_\_\_\_\_  
DATE

## APPENDIX I

### HOT WORK CHECKLIST

**PROCEDURE** - A hot checklist is required when ignition sources may be introduced. The contractors Site Safety Representative (SSR) is responsible for all site hot work.

**DEFINITION** - Hot work is any process which because of its design or function can cause ignition of a gaseous or vaporous atmosphere due to direct or indirect contact.

#### HOT WORK PERMIT

The SSR has surveyed the site and found the following Hot Work condition(s) do or may exist at \_\_\_\_\_ and will require permitting.

(location)

CONDITION	YES	NO	CONDITION	YES	NO
Welding			Electrical equipment, fixed		
Cutting			Electrical equipment, portable		
Use of power tools			Electrical equipment, hand-held		
Space heaters			Others		

<b>PRE-WORK CHECKLIST</b> All items must be completed.	YES	NO	N/A
Has the work area inspected by SSR prior to Hot Work beginning?			
Has a fire watch been established? Name?			
Is the fire extinguisher appropriate for the media?/Readily accessible?			
Is the work area clear of all trash and combustible debris?			
Is the equipment properly grounded?			
Has the area in which hot work is to be performed been monitored for combustible atmosphere?			
Will combustible gas indicator(s) (CGI) be used constantly during Hot Work?			
If no, why?			
List additional personal protective equipment (PPE) worn:			
Is welding or cutting on closed systems prohibited?			
Are their closed system cutting procedures established?			

DATE \_\_\_\_/\_\_\_\_/\_\_\_\_ TIME \_\_\_\_:\_\_\_\_ CHECKLIST EXPIRATION TIME \_\_\_\_:\_\_\_\_

CERTIFICATION OF SSR THAT HOT WORK MAY COMMENCE \_\_\_\_\_  
(SSR Signature)

A new hot work checklist will be required at the beginning of each shift or after more than one (1) hour intervals of no hot work procedure.

HOT WORK TEAM SIGN-OFF		
I/we have read and understand the terms of the above Hot Work Checklist		
NAME (PLEASE PRINT CLEARLY)	SIGNATURE	DATE/TIME

CERTIFICATION OF SSR THAT THE HOT WORK AREA HAS BEEN SHUT DOWN AND THAT, UPON INSPECTION OF AT LEAST 30 MINUTES AFTER HOT WORK SHUT DOWN, THAT NO IGNITION POTENTIAL EXISTS:

SITE SAFETY REPRESENTATIVE SIGNATURE\_\_\_\_\_ TIME:\_\_\_\_\_

## APPENDIX J

### MONTHLY WIRE ROPE & HOOK INSPECTION REPORT

WIRE ROPE INSPECTION REPORT								
CRANE NO.:		MILEAGE:		HOURS:		DATE INSPECTED:		
WIRE ROPE		(A) NUMBER OF BROKEN WIRES PER:		(B) % DIAMETER REDUCTION (WEAR OR CORE DAMAGE)		(C) KINKED, CRUSHED OR CUT, LOSS OF LAV., ETC.?	(D) LUBED, CORROSION (INTERNAL OR EXTERNAL), HEAT DAMAGE?	(E) TERMINAL TACKLE, BLOCKS, HOOKS, ETC.?
Type	Size	(1) Lay?	(2) Strand?	(1) Ind. Wire?	(2) Tot. Rope?			
Main Hoist (Ld. Line)								
Boom Hoist (Top Lift)								
Jib Hoist (Whip Line)								
Pendants (Main)								
Pendants (150 foot boom+)								
Jib guys (Upper)								
Jib guys (Lower)								

Inspected at (Location):\_\_\_\_\_ By:\_\_\_\_\_

Comments:\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## APPENDIX K

### MOBILE CRANE SAFETY INSPECTION CHECKLIST

CRANE INSPECTION CHECKLIST					
CRANE NO:	MILEAGE:	HOURS:	DATE:		
<b>A. GENERAL REQUIREMENTS</b>	<b>OK</b>	<b>*REP</b>	<b>C. MAIN MACHINE</b>	<b>OK</b>	<b>*REP</b>
1. Capacity charts in cab			1. Controls		
2. Special instructions posted			2. Clutches		
3. Barricades (tailswing)			3. Brakes		
4. Exhaust pipes guarded			4. Brake locks		
5. 5 BC fire ext. in cab			5. Main drum		
6. First-aid kit in cab			6. Boom hoist		
7. Safety glass in cab			7. Boom hoist panel		
8. Guardrails/hand holds			8. Boom hoist kickout		
9. Platform and steps/non-skid			9. Oil leaks		
10. Proximity signs, 10 ft. min.			10. Hook rollers and turret		
11.			11.		
<b>B. ATTACHMENTS</b>			<b>D. CARRIER</b>		
1. *Hooks and blocks (safety latch on hook)			1. Steering		
2. Sockets and rope clamps			2. Brakes (all system)		
3. Boom and lacing			3. Lights, horns, wipers		
4. Boom stops			4. Transmission		
5. Spreaders and gantry			5. Differential		
6. Jib and stops			6. Clutch		
7. Outriggers and pads			7. Engine		
8. Counterweights			8. Tires and wheels		
9.			9. Gauges		
10.			10.		
USE WIRE ROPE FORM FOR CABLE INSPECTIONS					

Inspected at: (Location ) \_\_\_\_\_ By: \_\_\_\_\_

\* Repair or Replace – Respond on the reverse side by specific item letter and number. Require separate, recorded annual inspection for deformation and/or cracks.

## CRANE OPERATOR'S WRITTEN TEST

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Answer the following questions. There is only one (1) right answer for each question.

### OSHA CRANE SAFETY REGULATIONS

1. A load rating chart shall be located:
  - a. In a location which is clearly visible to the operator.
  - b. Within reach of the crane operator's work station.
  - c. Both a & b.
  - d. None of the above.
2. A visual inspection of the entire crane should be performed:
  - a. Daily.
  - b. Weekly.
  - c. Monthly.
  - d. Only when equipment is not functioning properly.
3. Mobile cranes whose outriggers are not fully extended should use the \_\_\_\_\_ to determine capacity.
  - a. Crane's outrigger chart.
  - b. Crane's rubber chart.
  - c. Boom angle indicator.
  - d. Crane's stability.
4. If the weight of a load is unknown, the crane operator should do what?
  - a. Do not make the pick until the weight is determined.
  - b. Lift it carefully to test the crane's stability.
  - c. Get a qualified person to determine the weight of the load.
  - d. Both a & c.
5. What actions should be taken if there is danger of persons or equipment becoming caught between rotating parts of the crane and other objects?
  - a. The swing radius should be roped off.
  - b. The hazardous area should be barricaded off and training performed for individuals working within the barricade system.
  - c. Warn everyone to KEEP OUT!
  - d. Either a or b, depending on the situation.



6. The minimum required boom clearance when working around energized high voltage lines (50,000 volts or less) is:

- a. 5 feet.
- b. 10 feet.
- c. 12 feet.
- d. 20 feet.

7. A **quad** is valid for a period of \_\_\_\_ years.

- a. 2 years.
- b. 3 years.
- c. 4 years.
- d. 5 years.

## **APPENDIX L**

### **DRUG-FREE WORK PLACE ACT**

Every person or organization awarded a contract or grant by the UDOT for the provision of services shall certify to the STATE that it will provide a drug-free work place by doing all of the following:

- a. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited in the work place, and specifying the actions that will be taken against employees for violations of the prohibition.
- b. Establishing a drug-free awareness program to inform employees about all of the following:
  - 1) The dangers of drug abuse in the work place.
  - 2) The organization's policy of maintaining a drug-free work place.
  - 3) Any available drug counseling, rehabilitation, and employee assistance programs.
  - 4) The penalties that may be imposed upon employees for drug abuse violations.
- c. For those projects which are partly funded by a Federal grant, these additional requirements will apply:
  - 1) Each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a) above.
  - 2) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will
  - 3) abide by the terms of the statement; and
  - 4) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the work place no later than five calendar days after such conviction;
  - 5) The employer will notify the UDOT in writing, within ten calendar days after receiving notice under paragraph 4 from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title to the UDOT on those projects under Federal grant.
  - 6) Take one of the following actions, within 30 calendar days of receiving notice under paragraph (d) (2), with respect to any employee who is so convicted.
  - 7) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

- 8) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;
- 9) Making good faith effort to continue to maintain a drug-free work place through implementation of paragraphs (a), (b), and 8 1 through 10.
- 10) The general contractor will ensure that all subcontractors and lower tiered contractor have a written Drug-Free Work Place Policy that will comply with the requirements of this section.
- 11) The grantee may insert in the space provided below the site(s) for the performance of work done in connection with the specific grant: Place of performance (Street address, city, county, state, zip code).
- 12) Applicable drug and alcohol testing standards according to Utah Code Annotated, Section 34-38-1 apply for State of Utah employees.

## **APPENDIX M**

### **EMPLOYEE SAFETY AWARENESS PROGRAM (EASP)**

Each Contractor is responsible for generating an Employee Safety Awareness Program.

## APPENDIX N

### NOTIFICATION OF INTENT TO PROCEED WITH EXCAVATION

CONTRACTOR: \_\_\_\_\_ DATE: \_\_\_\_\_ NO. \_\_\_\_\_

DATES OF EXCAVATION FROM: \_\_\_\_\_ TO: \_\_\_\_\_  
(MAXIMUM FOUR (4) WEEKS. IF EXCAVATION MUST CONTINUE A NEW NOTIFICATION MUST BE MADE.)

DESCRIPTION OF EXCAVATION:

EXCAVATION LOCATION: (INDICATE NORTH AND PROJECT SITE COORDINATES)

NAME OF COMPETENT PERSON IN CHARGE OF EXCAVATION: \_\_\_\_\_

EXCAVATION GREATER THAN 4FT DEEP: \_\_\_\_ YES \_\_\_\_ NO, MAXIMUM DEPTH: \_\_\_\_\_  
FEET

SPECIAL CONDITIONS/ PROCEDURES:

OSHA PERMIT RECEIVED: (If Required) \_\_\_\_\_ BLUESTAKE NOTIFIED:

\_\_\_\_\_ SAFETY PLAN/TRENCH SHORING PLAN SUBMITTED:

\_\_\_\_\_

FACILITY OWNERS NOTIFIED: \_\_\_\_\_ (DATE OF NOTIFICATION)

CONTRACTOR'S AUTHORIZED REPRESENTATIVE DATE

#### SPECIAL CONDITIONS/PROCEDURES

THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE EXECUTION OF THE WORK.  
SPECIAL CONDITIONS OR PROCEDURES TO BE OBSERVED FOR THIS EXCAVATION:

\_\_\_\_ AS BUILT DRAWINGS ARE REQUIRED FOR THE INSTALLATION OF ALL TEMPORARY OR  
PERMANENT UNDERGROUND UTILITY PIPELINES, DUCT BANKS AND CABLES.

\_\_\_\_\_  
UDOT SAFETY RISK MANAGER

\_\_\_\_\_  
DATE

## **NOTIFICATION OF INTENT TO PROCEED WITH EXCAVATION**

- A. No excavation, earthwork, underground utility installation, foundation or temporary facilities construction, shall begin until the CONTRACTOR has submitted a **NOTIFICATION OF INTENT TO PROCEED WITH EXCAVATION** to the ENGINEER.
- B. The purpose of the notification procedure is as follows:
  - 1. Notifies the UDOT Safety Risk Manager of the need for monitoring the excavation and to assure that all safety plans and/or trench shoring plans have been reviewed.
  - 2. Advises the Site UDOT Safety Risk Manager of the name of the Competent Person in charge of the excavation.
  - 3. Allows the ENGINEER to notify the CONTRACTOR of special conditions or procedures required during the excavation.
  - 4. Notifies the ENGINEER of any work that must be coordinated by the CONTRACTOR with other parties onsite.
- C. CONTRACTOR shall notify the ENGINEER of intent to excavate by transmitting a "NOTIFICATION OF INTENT TO PROCEED WITH EXCAVATION" at least five (5) days prior to the date proposed for the start of excavation. CONTRACTOR shall not submit the request until all required safety/shoring plans have been reviewed and the notifications required have been completed.
- D. The CONTRACTOR shall number the requests consecutively as directed by the ENGINEER. A copy of the notification shall be maintained on file and the Contractor's Competent Person shall have access to a copy at all times while work is progresses within the excavation.
- E. This program shall not relieve the CONTRACTOR of any responsibilities for conducting the work in a safe manner and meeting all the requirements of OSHA or the CFR Construction Safety Orders for Excavations. Nothing in this section shall change the requirements of the General Conditions, Underground Utilities or other safety requirements.

## APPENDIX O

### COMPETENCY TEST FOR SAFETY

Employer: \_\_\_\_\_

Date: \_\_\_\_\_

Name: \_\_\_\_\_

True	False	Craftsman
		1. All injuries, no matter how slight, must be reported to your foreman immediately.
		2. Using compressed air or other gasses for blowing off clothing or body is allowed.
		3. Hard hats, safety glasses, work boots, long pants and sleeved shirts are required on the project site.
		4. Ladders should extend three (3) feet above a landing and be tied off.
		5. Handrails and toeboards shall be installed on all scaffolds except rolling scaffolds.
		6. Lift with your legs, not your back.
		7. Keep empty and full compressed gas cylinders upright and secured at all times.
		8. Fuels should only be stored in properly labeled safety containers.
		9. A GFCI is not required when a tool is properly grounded.
		10. Unsafe conditions or near misses shall be reported immediately.
		11. Trenches less than six (6) feet in depth do not require shoring or sloping.
		12. Taglines are only required on large loads.
		13. Compressed gas cylinders should be laid down while transporting.
		14. Illegal drugs and alcohol on the project site are prohibited.
		15. When working in tight areas, it is permissible to ride a load in a bucket or the hook on a crane.
		16. Violating safety rules may result in permanent removal from the site.

True	False	Operators
		17. Operators must inspect equipment, fuel, oil and water levels before operating equipment.
		18. Heavy equipment shall not be operated within ten (10) feet of overhead power lines.
		19. Never raise a load over other workers.
		20. Gasoline is an approved cleaning agent.
		21. It is unnecessary to secure a load on a truck for a short job site move.
		22. Crane operators may exceed capacity charts if instructed to do so by their supervisor.
		23. Welders must wear leathers, UV shield, gloves and occasionally a respirator during the performance of their duties.
		24. Only trained and authorized employees shall operate equipment.
		25. Defective equipment should be removed from service until necessary repairs have been made to make the equipment safe.
		26. It is permitted to hoist employees in a bucket, on a suspended load, on the forks of a lift truck, or the hook of a crane.
		27. When chipping or cutting, eye, face and head protection is required.
		28. A hot work permit should be completed before welding in a hazardous or uncontrolled area.
		29. Violating site safety rules or requirements may result in immediate and permanent removal from the project site.
		30. Welding screens are only required on dark or windy days.
		31. Forks should be as near to the ground as possible while moving a load.
		32. Equipment should be parked, secured and the key removed when not in use, or the operator is greater than 25 feet from the equipment.



## APPENDIX P

### LEAD PROTECTION PROGRAM CHECKLIST

(Detach for Posting)

UDOT is committed to providing all employees with an injury free work environment. To ensure this, we developed the following updated guidelines for managing the health and environmental hazards of lead exposure.

- \_\_\_\_\_ 1. Before working on a painted surface, coating removal/application, ironwork, etc., the coating must be analyzed for lead and PCB's.
- \_\_\_\_\_ 2. All lead related activities must incorporate engineering, administrative and work practice controls, such as ventilation, job rotation, worker isolation, and steel preparation without removal in their activity plan to minimize lead exposure to <50 ug/mg when feasible.
- \_\_\_\_\_ 3. Employees exposed to lead dust/fumes must have their blood checked following UDOT's medical surveillance program, for lead levels **prior** to exposure.
- \_\_\_\_\_ 4. If an employee's BLL test result is at or above 30 ug/dl (UDOT's action level), a First Report of Incident must be completed, and the cause investigated.
- \_\_\_\_\_ 5. If a BLL test result is at or above 40 ug/dl, a First Report of Incident must be completed and the employee removed/excluded from the contaminated work environment until two consecutive test results indicate levels below 40 ug/dl. Note: A BLL at or above 50 ug/dl is an OSHA recordable illness.
- \_\_\_\_\_ 6. To prevent ingestion and inhalation of lead dust/fumes, UDOT employees working around lead must use UDOT supplied protective clothing and equipment.
- \_\_\_\_\_ 7. Jobsite hygiene controls will include the following:
  - \* running water (heated if possible)
  - \* showers if results from air monitoring show >50 ug/m3 (PEL)- Adjust PEL if working other than 8 hour shifts.
  - \* soap (pumpable if possible)
  - \* clean towels to wash up
  - \* clean un-contaminated break area
  - \* clean un-contaminated change area
  - \* clean weekly coveralls (daily if levels are >200 ug/m3)
  - \* work areas cleaned with HEPA vacuum
  - \* proper respiratory protection (supplied air, PAPR, etc.)
- \_\_\_\_\_ 8. Before lead work starts, employees must receive training in UDOT's Hazard Communication Program about lead hazards.
  - \* Identification
  - \* Elimination
  - \* Personal Protection
  - \* Medical exams/consultations
  - \* OSHA lead standard
  - \* Engineering controls/good work practices
  - \* Access to records
- \_\_\_\_\_ 9. Assessment and ongoing air monitoring **must** be done at specific intervals (as defined in Airborne Lead Monitoring Section of this policy) to ensure respirator and personal protection is adequate when a lead dust or fume hazard exists.
- \_\_\_\_\_ 10. All lead waste is "hazardous" and must be stored, labeled and shipped according to the Federal and State Standards.

## APPENDIX Q

### LEAD WORK INSPECTION CHECKLIST

1. ☐ Activity/area description \_\_\_\_\_
2. ☐ Housekeeping \_\_\_\_\_
3. ☐ Areas vacuumed/cleaned \_\_\_\_\_
4. ☐ Work areas controlled and signs posted \_\_\_\_\_
5. ☐ Respirators stored properly \_\_\_\_\_
6. ☐ Mechanical ventilation operation/flow \_\_\_\_\_
7. ☐ Engineering controls adequate \_\_\_\_\_
8. ☐ Administrative controls adequate \_\_\_\_\_
9. ☐ Activity plan current and in the workplace \_\_\_\_\_
10. ☐ Air monitoring current \_\_\_\_\_
11. ☐ Wipe sampling current \_\_\_\_\_
12. ☐ PPE (coveralls, boots, hats, gloves, etc.) adequate \_\_\_\_\_
13. ☐ Hygiene practices adequate \_\_\_\_\_
14. ☐ Wash/change facilities clean/organized \_\_\_\_\_
15. ☐ Breathing air systems operation check \_\_\_\_\_
16. ☐ Waste storage proper \_\_\_\_\_
17. ☐ Employee lead training completed \_\_\_\_\_
18. ☐ Lunch/break areas clean \_\_\_\_\_
19. ☐ Smoking, eating, drinking, work areas \_\_\_\_\_
20. ☐ Respirators appropriate for activity \_\_\_\_\_
21. ☐ Blood tests current \_\_\_\_\_
22. ☐ Appropriate power tools being used \_\_\_\_\_
23. ☐ Fit testing/medical exams current \_\_\_\_\_
24. ☐ Lead waste contained to work and hazardous waste storage areas and labeled \_\_\_\_\_
25. ☐ Evaluate public/private inhabitants in surrounding work areas that could potentially be affected by lead fumes/dust release. \_\_\_\_\_

Competent Person: \_\_\_\_\_

Date: \_\_\_\_\_

## APPENDIX R

### MEDICAL EXAM DECLINE FORM

I, \_\_\_\_\_ have declined to take a complete medical exam offered to me by my employer even though my blood lead levels are above 40 ug/dl and below 50 ug/dl.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Employee's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Project Engineer/Project Manager

Cc: Safety/Risk Manager

Date: \_\_\_\_\_

## **CONTENT OF MEDICAL EXAM FORM**

The content of the medical exam shall be determined by an examining physician and must include at least the following:

1. Fertility test or pregnancy test if requested by the employee
2. Detailed work history and medical history
3. Thorough physical examination
4. Pulmonary status
5. Blood pressure measurement
6. Blood lead testing with ZPP
7. Hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral smear morphology
8. Blood urea nitrogen
9. Serum creatinine
10. Routine urinalysis with microscopic examination (this is not a drug test)
11. Other relevant testing determined by the examining physician.

Give two copies of this to employee before they go to their medical evaluation. They can give a copy to the examining physician.